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22–28 January 1987

Vol 6 No 4

SPECIAL supplement

Beginners' Guide to Computing Part two

Making music

Further steps in Basic

SUPERBOWL SPECIAL

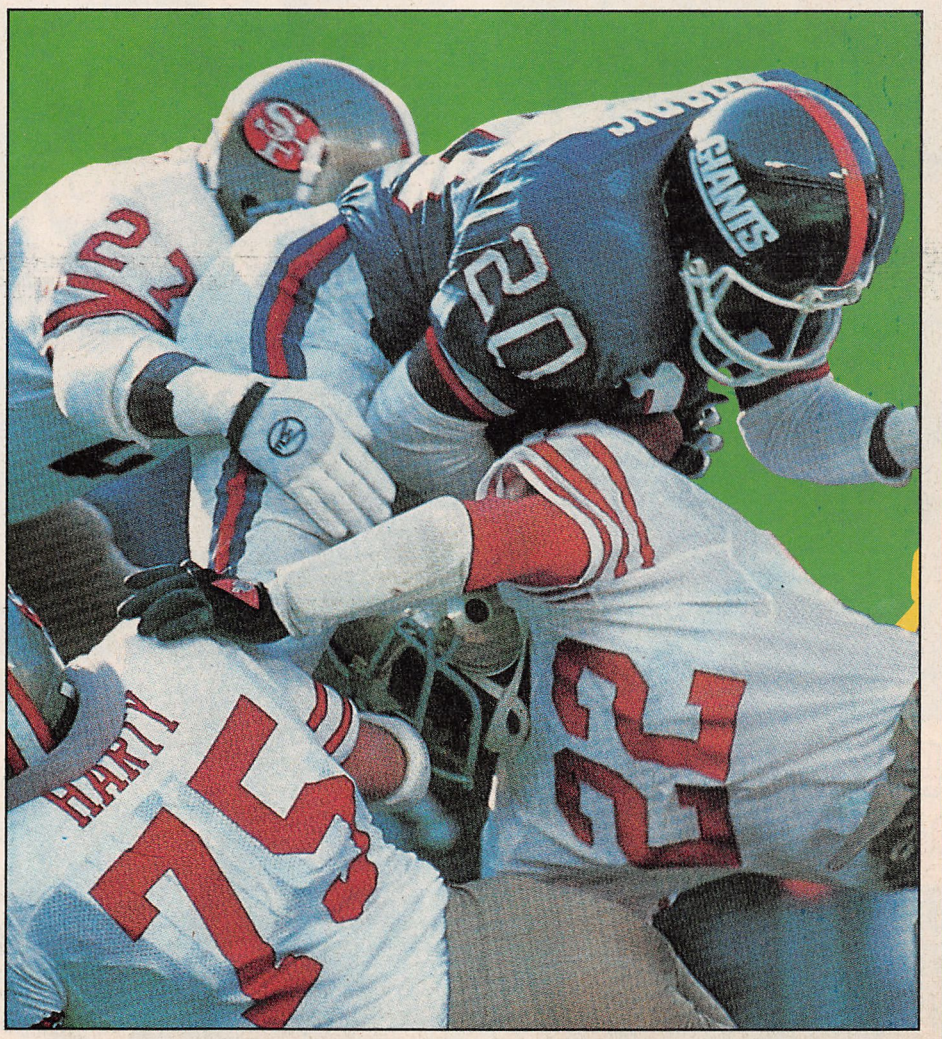
Check out the best American Football games for your micro

SUPERBOWL COMPETITION

Ten copies of The American Football Book 4 to be won

Atari's new PC and Mega STs: UK launch dates

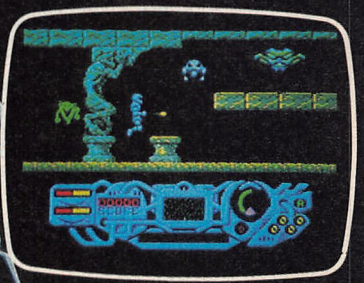
see page 4 for details



From The American Football Book 4/Queen Anne Press

THE SACRED ARMOUR OF

ANTIRIAD



Actual screen shots from the Commodore

Now Available for the AMSTRAD

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Available from all good computer game stockists or by mail order from Palace Software, 275 Pentonville Road, London N1 9NL. Send cheque or postal order for £8.99 plus 80p p&p. Access and Barclaycard holders phone 01-278 0751.

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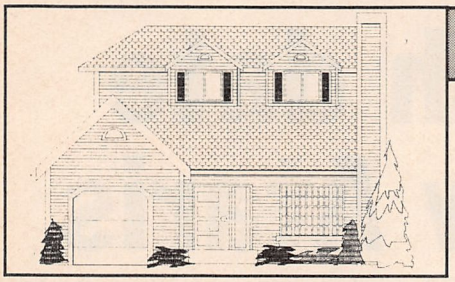

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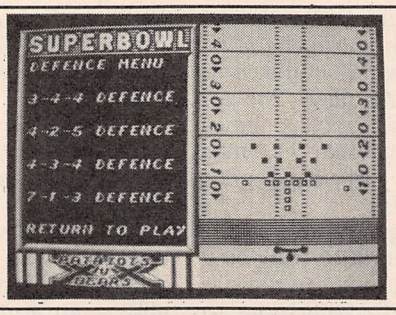

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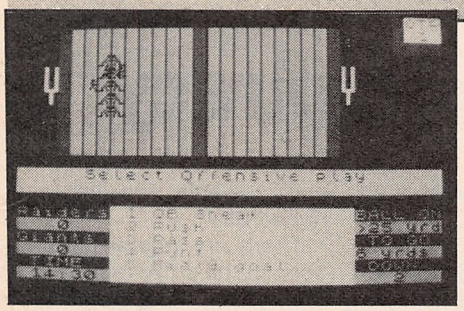

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Small software houses face a bleak future

US Gold and Ocean consolidated their grip on the games software market over Christmas achieving, according to Simon Treasure of Gallup's Chartalk newsletter, a 25 per cent share of the whole market and one third of the full price market.

This is bad news for the small software houses. In previous years they've managed to come up with a few Christmas hits of their own, but this time, says Treasure, "they all came from the big boys, the marketeers."

He feels it's now clear that the games software market is now both established and profitable, estimating the market at anything from £3 million to £12 million over Christmas, but predicts that there will be "only ten potential top ten houses by the end of the year." According to Gallup the US Gold top companies are currently Mastertronic, Firebird, Elite (the most successful independent), Imagine, Ocean and Gremlin.

April launch date for the new Ataris

ATARI's new PCs are to be launched in the UK at the end of April along with the 2Mb and 4Mb Mega STs, the company has announced. The latter machines should, however, be available in small quantities a few weeks prior to the launch.

According to Atari UK managing director Bob Gleadow there are currently two models of the PC, with more to follow. Prices in the UK haven't been fixed yet, but if US prices are anything to go by they will certainly be under the Amstrad PC's.

The cheaper model, $499 (£356) in the US, is aimed at the home market and comes with single drive and colour graphics adaptor, but without monitor.

The pricier model at $699 (£499) includes an Enhanced Graphics Adaptor (which the Amstrad PC won't run properly) and a high resolution monitor.

The monitor retails separately for $200 (£140), but although this makes the hardware price of the two machines the same Gleadow says the $499 version plus a cheap third party monitor will still be an attractive buy for some users.

Neither of these machines has expansion slots, but Atari intends to produce what Gleadow terms a "professional system" towards the middle of the year. This will have three expansion slots and a built-in 20Mb hard disc, and will sell at around £1,000.

Atari also has plans for a machine based on the Intel 80286, but is holding back until it knows what IBM is planning. The latter company is thought to be planning to launch a machine based on the 80286 very soon, and Atari wants to look at this before it goes ahead with its own.

Back on the ST front Atari says that it will be possible to connect the current generation of STs to its new laser printer, but that unlike the Mega STs they will need to have a 1Mb Ram buffer fitted. This is currently being produced.

The blitter chip should also be fitted as standard on STs in the near future, and machines in this configuration should start coming into this country in the summer.

Amstrad secures hard disc supplies

AMSTRAD'S search for a secure source for hard discs for its PC seems to be bearing fruit, with the announcement by hard disc manufacturer Western Digital that it has signed a contract to supply £7.3 million worth of hard disc controllers to Amstrad.

Western Digital won't say exactly how many controllers this represents, but concedes that it will be supplying 10–15,000 per month to Amstrad for the next five months. Amstrad is currently producing 70,000 PCs per month, some 45 per cent of which are fitted with hard discs, so the Western Digital deal will account for one third to a half of Amstrad's total hard disc output until the middle of the year.

Microprose acts on piracy

MICROPROSE is to put serial numbers on all copies of its *Gunship* helicopter simulation in a bid to stop software piracy. Magazines being sent review copies of the game, due for release early next month, will also be asked to sign non-disclosure agreements "allowing Microprose to take legal action against anyone found to have pirated it."

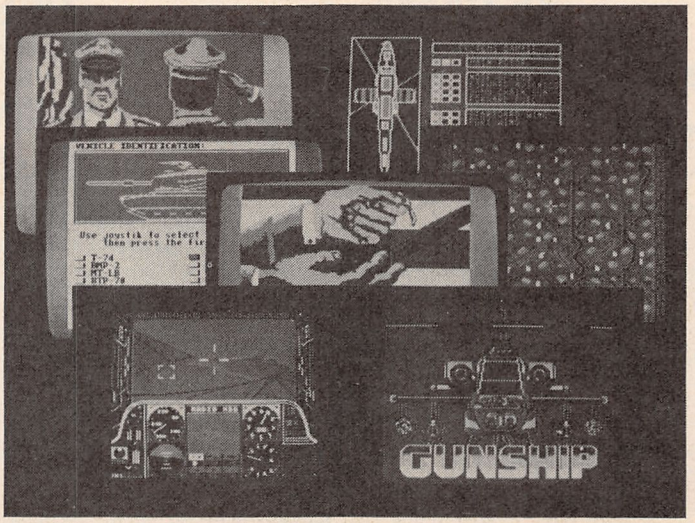
"*Gunship* cost $1.6 million (about £1.14 million) to develop, and we're very concerned that people will copy it," says Microprose UK managing director Stewart Bell. "We have no history of people ripping us off, but we're concerned that so many people say they get ripped off."

There are regular suggestions in the software industry that some computer magazines are heavily involved in piracy, but as yet these rumours have not been substantiated.

Preview copies of *Gunship* will, however, be held back until the last minute to avoid any risk of the game being pirated before its launch. It will initially be available on the 64, with IBM, Apple, ST, Amstrad, Spectrum and Amiga versions to follow over the next few months.

Microprose has also announced that it has won the licence for *Red Storm Rising,* a World War III blockbuster novel that has sold a million copies in hardback in the US. The book is written by Tom Clancey, author of *The Hunt for Red October.*

The game is to be programmed by Sid Meier, who wrote *F15 Strike Eagle* and *Silent Service.*



***Gunship* – now with added serial**

Thin year for Beyond?

BEYOND, troubled sister label of Firebird and Rainbird, still can't give a firm date for the release of *Star Trek,* and seems to be looking at a thin product range for most of this year.

At the moment only *Star Trek* and *Dark Sceptre* are in development, and according to Tom Watson, group marketing manager for the Telecomsoft labels, once these two are released, Beyond will be concentrating on conversions. "This will take us pretty fully into late summer, early autumn." Software houses should begin to think about Christmas 1987 releases in the next few months, but according to Watson, Beyond has yet to decide on releases other than *Star Trek* and *Dark Sceptre.*

The game is currently being discussed, and Mike Singleton, who headed the *Star Trek* development team and was responsible for *Lords of Midnight* and *Doomdark's Revenge,* has "a couple of ideas he came to us with". These ideas have yet to be approved, and Beyond hasn't yet decided whether or not to go ahead with *Eye of the Moon,* the third part of Singleton's *Doomdark* trilogy.

Singleton has meanwhile produced *Throne of Fire* for Melbourne House (see Software Hotlines) and is thought to be in discussion with Hocus Pocus, the label set up by Beyond ex-staffers Marc Peirson and Simon Goodwin. As Singleton was to a great degree responsible for Beyond's early successes this can hardly be good news for the label.

DIARY DATES

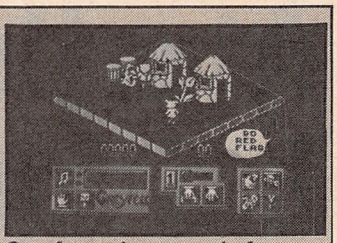
17–20 February
Which Computer? Show
NEC, Birmingham
Price: £5
Organiser: Cahners Exhibitions, 01-891 5051

20–22 March
The Electron & BBC Micro User Show
UMIST, Manchester
Price: £3 adult, £2 children, £1 discount for advance booking
Organiser: Database Exhibitions, 061-456 8835

24–26 April
The Atari Computer Show
Novotel, London W6
Price: £3 adult, £2 children, £1 discount for advance booking
Organiser: Database Exhibitions, 061-456 8835

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. *Popular Computing Weekly* cannot accept responsibility for any alterations to show arrangements made by the organiser.

Software Hotlines



Greyfell – the Legend of Norman

There was *Nosferatu the Vampire* from **Piranha,** then *Dracula* from **CRL,** and now another horror based program is on the way – *Bride of Frankenstein* from those cuddly people at **Ariolasoft.**

In this arcade adventure you actually play the part subtly hinted at in the title, with the task of reviving Frankenstein himself. Hmmmm.

If that sounds weird, even more wackiness is promised in a title called *Magic Marbles*, due out in March/April, but sooner you'll be getting *Ziggurat* (exploration of a temple filled with Mimbies – crosses between Zombies and Mummies, they say) and *Triaxos* (a race against time in a prison satellite), both designed by those wearers of colourful jumpers, **Tigress Designs.**

Ariola also has some nebulous relationship with that newest of software labels, **Starlight.** Set up primarily by ex-**Beyond** Frances Lee (set up with some money his Mum had left out of the housekeeping?), the first game, *Greyfell – The Legend of Norman,* is looking pretty good.

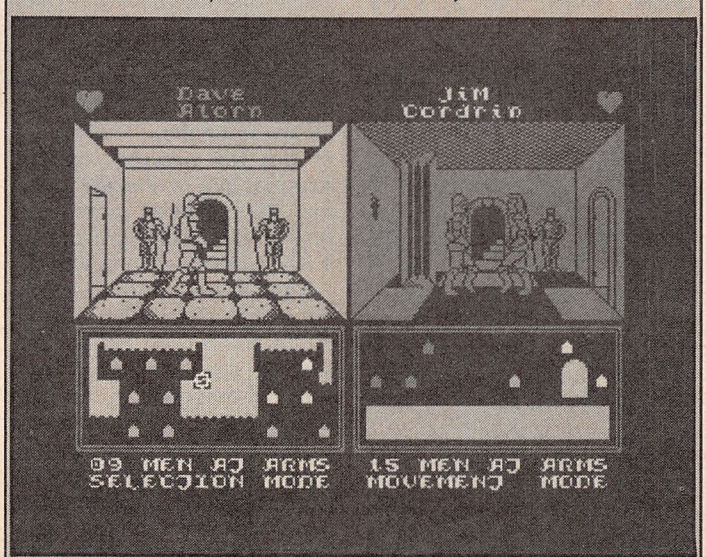
In it you play the part of Norman the Cat who, after a night on the tiles, gets conned into saving the Land of Greyfell from the evil clutches of Moron. Nice one Norm. Scheduled for a February launch on Spectrum, CBM 64 and Amstrad CPC, later **Starlight** releases planned include *Deathscape* – which sounds suspiciously like a shoot 'em up to me.

Golly, doesn't that fabulously rich person Mike Singleton put himself around these days? He's now designed a game for **Melbourne House,** called *Throne of Fire,* and as you can see it looks very impressive indeed. I say designed as Mike is now just like Vidal Sassoon, in that he goes in and does the 'creative' bit, then the underlings come in and do the business.

Dare I make mention of *Dark Sceptre? Eye of the Moon? Star Trek,* even? All games that poor old **Telecom** may or may not have paid the bananas for, but still can't name a firm date for release.

They're not scared to put their reputation on the line at **Melbourne House,** however. "All versions of *Throne of Fire* will be released in April 1987," (Spectrum, Amstrad CPC, Commodore 64), says **MH.** Where angels fear to tread, eh?

Just a quickie – I bet you didn't know that **Ocean** was doing *Arkanoid, Mutants* and *Short Circuit.* Oh . . . you did? Want a job? **John Cook**



Throne of Fire

Atari's new bid for PC stardom

US electronics shows can be dispiriting. They're big, confusing, and tend to come in batches, so you can find it difficult to shake that nagging feeling that you might just have turned up at the wrong one.

Fortunately, courtesy of Atari, no such doubts were evident at the recent Las Vegas CES (Consumer Electronics Show). Without Atari, the computer industry wouldn't have had much of a look in, but the launch of the new STs, laser printer and Atari PC soon had the hype – and the rumours – flowing again.

Enter the PC

Two weeks ago Atari was almost universally accepted as a company that would continue to sidestep the PC standard, but although they were caught by surprise, the industry pundits have gone into overdrive since then.

Atari launched two PCs (see News Desk), one at $499 (about £356) and one at $699 (about £499), and this puts them both comfortably under Amstrad's US prices, which start at $799 for a single drive machine and monitor.

The 128D: US debut

Atari's CES circus effectively eclipsed the Amstrad launch, with many attendees failing to notice the machine, and many more treating it as "just another cheap clone," but the objective now seems to be to kill the machine stone dead in the States.

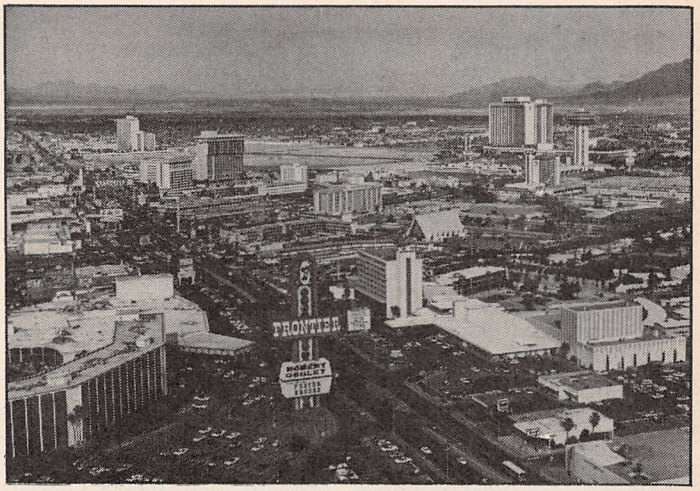
Amstrad has now fallen out with Sears, the US retail chain which stocked, but failed to sell, the PCW in any volume, and is now going through distributor Vidcom for the PC. Vidcom is paying upfront for the PC stocks it gets from Amstrad, but this will make price-cutting a complicated business, involving re-negotiation all along the line.

So when the Atari PC hits the US market in March, Jack Tramiel should find it easy to keep the price healthily under Amstrad's, and to stunt the British company's growth.

Distribution

It won't be so easy in the UK, particularly as the machines won't be here in quantity until summer. In recent years Atari UK's distribution has been something of an Achilles' heel, and although the company is working on new dealers – in particular new business dealers – it has yet to get the network up and running. We're unlikely to see the PC succeed here until Atari is sure it can actually get it into the stores in volume.

Back at the rumour factory, however, they were talking about an 80286-based version of the Atari PC. From zero PC presence to rumours of the successor machine inside a week is going some, even for Atari, but Atari UK capped this by confirming the rumour last Friday (see News Desk). The Intel 80286 is the upgrade to the PC's 8088/8086 used in IBMs PC AT, and can produce a faster machine while adding little to component costs. Amstrad itself is now thought to be looking in similar directions.



Las Vegas

Low-cost laser

The Atari laser printer could become even more important than the PC. Although the number of laser printers on the market has increased dramatically over the last year most of them are badged versions of machines manufactured by a handful of companies.

Atari's $1,500 (£1,071) laser is manufactured by Canon, and is intended to be available in two versions: one dedicated ST laser printer that uses the ST's power rather than having on-board logic (many lasers use a 68000 CPU anyway) and one that effectively has an ST inside it. The latter will be able to hook up to other machines.

The rivals

The other major players in the micro industry were a lot quieter at the show. Apple was keeping quiet about its Mac successors, which could be announced any day now, while Commodore ostensibly confined itself to tried and tested technology, unleashing a couple of lacklustre PCs, the 128D and a few peripherals on to the US market. The 128 has been much more successful in the US than it has been here, and the appearance of the 128D there (it was originally sold only in Europe) is a signal that Commodore thinks there's life in the old dog yet.

The peripherals launched included a $3\frac{1}{2}$ inch disc drive for the 64/128, offering 808K of storage and a claimed threefold increase in data transfer rates. This will sell for $399 (£285). The 1764 Ram expansion model for the 64 costs $129 (£92) and allows an extra 256K Ram to be used as a Ram disc. Of the new Amigas, however, there was no sign. Or was there?

Added Amigas

Various Commodore "trusties" were allegedly invited to a private suite where they were allowed to view the new Amigas. The bottom-end A500 will retail for $599 (£428) and will have 512K Ram and a built-in disc drive. This puts it fairly close to the 520STFM price-wise and will make it a serious rival to the machine if Commodore releases it in the near future. The A2000, the replacement for the current Amiga, will sell at $1,500 (£1,071) for a 1Mb machine with seven expansion slots. Commodore UK still won't say when we're likely to see the new machines here.

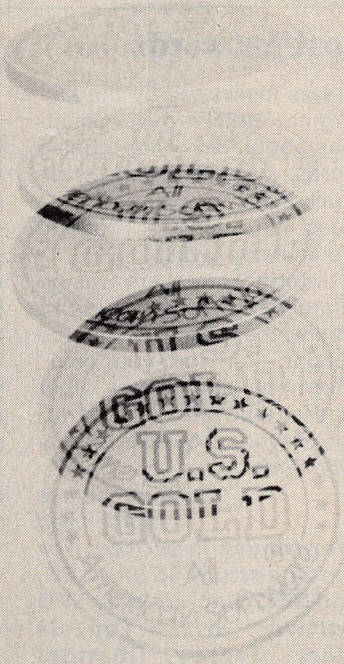
Games consoles accounted for a fair amount of floor space at the show, with both Sega and Nintendo putting on spectacular shows. Third party support for the beasts wasn't too evident, but one company had come up with a floormat/joystick system called *Family Fitness.* You run on the mat and a little figure on the screen does the "Chariots of Fire" bit – $50.

DON'T LEAVE YOUR FUTURE TO CHANCE

Successfully publishing software without an expensive marketing program and guaranteed European distribution became a thing of the past during 1986. This year software publishing without the strength of a brand name will become increasingly difficult. The risk elements are mounting up: advertising expenditure, U.K. and European video production, artwork design, manufacturing, stock and credit.

In re-directing those creative and development talents towards U.S. Gold's format conversions of mainline American software, Arcade conversions and license projects, you enter the no-risk area of a working association with U.S. Gold.

We have the resources to meet our financial obligations. We have an unparalleled depth of experience in understanding software development.



What other people think about us...

D.I. Weatherburn of Canvas says:

"Canvas has enjoyed a good working relationship with U.S. Gold throughout 1986 having been involved in the development of translations and arcade games such as Spectrum "Super Cycle" and "Breakthru" on three formats; "PSI-5" and "Leaderboard".

Working with U.S. Gold provides us with a level of financial security which is hard to find in this industry and they display an understanding of the many problems of software development which is second to none."

Mike Woodruff of Adventuresoft says:

CASHFLOW *"The singular most important advantage of working for a large software house such as U.S. Gold is undoubtedly the fact that cashflow can be forecast accurately. Gone are the days of worrying about how to pay the wages at the end of the month, regular payments made against work completed are the answer to all these problems."*

LICENSES *"U.S. Gold, due to their enormous financial strength, are in a position to acquire the rights to the very best licensing deals, any software house who is developing products based on these licenses has a great advantage in the market place, especially if royalties are being payed for a successful product."*

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IDENTITY *"Although all distribution is done by U.S. Gold we have maintained our own identity, and have not just become another cog in a conglomerate wheel. This maintains the interest of our programmers and artists who do not want to feel that they are being dictated to by a large autonimous corporation and this in turn ensures that the standard of work is maintained."*

Charles Cecil of Paragon Programming Ltd., says:

"Having converted several games notably the number one hit "Infiltrator", we have found them to be very good clients. The company is well organised providing considerable assistance with translations. Additionally they are one of the rare companies in this industry that are prompt with payments."

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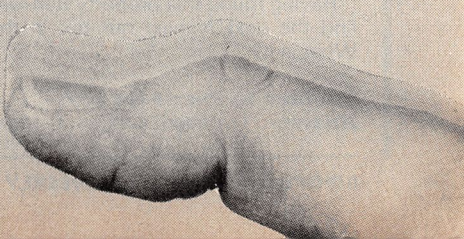


Letters

Lost for words

I was fascinated by the Zigurat article over Christmas about *Wordfinder*. Being a crossword addict and often stuck with only one or two clues left, such a program would be very helpful.

Unfortunately there was no reference in the article as to where the program can be bought. Perhaps you could inform me, and all your other readers who are thus frustrated, of who to contact to buy *Wordfinder*.

Stephen Ivermee
Leatherhead

***Wordfinder* is written for the Spectrum 48 and 128, and BBC machines by WD Software at Hill Top, St Mary, Jersey, Channel Islands.**

Age of Aquarius?

The Sunday after Christmas the two grandchildren took their Christmas money and went to a local market.

When they came back a stallholder had sold them a 1982 Aquarius computer. As it had no handbook or instructions with it, it just stands there doing nothing and I can't afford to get them another one yet.

I was hoping someone might know where I might get some instruction books or user's guides so I can get the kids started in computers.

V E Cole
Horsham

Our advice is to look in the classified advertising sections of computer magazines (such as Computer Swap in this publication) – someone may be offering what you require, or to browse through book shops, where a number of computing titles can now be picked up very cheaply.

If any readers have any better ideas, write in and tell us and we'll forward the letters on.

ST prices . . .

I was wondering if you could tell me if you think it is possible that Atari may drop the price of its 520STFM machines in the future, and if so, by how much?

Also, could you tell me the prices of the cheapest, but reliable, printers for the machine, and whether or not there are any decent word processing packages for it?

Jonathan Crisop
Cleveland

Atari has just recently dropped the price of the 520STFM to £399.95. This price should hold for a few months at the very least, but Atari does have scope for further cuts if it wishes. You pays your money and you takes your choice.

At the moment there are several perfectly capable word processors for the machine, and Microsoft *Word*, one of the standards on the IBM PC, is due to be released on it shortly. Watch this space for a comparative review of ST wp packages.

. . . and ST Ram discs

Marvey Mills' comments (Letters, January 1) about Atari ST Ram discs come from acceptance of two potential problems with them, which I fear may not be acceptable to beginners any more than they are to me.

In the first place, Ram discs which automatically assume the letter of the first 'free' drive slot, like Microdeal's, run into problems when you press the reset button. Try repeating this a few times with just the boot discs (containing the Ram disc program in an *Auto* folder, as instructed), and you quickly discover that you have accumulated a number of 'dead' discs (C, D, etc) and your Ram disc may now be F or G. On the other hand, the BackPack Ram disc, which is installed as a fixed drive letter each time, will always be that, no matter how many times you press the reset button. The only way of getting back to a sensible position with the Microdeal type (and several other programs are similar) is to turn the machine off.

As to the disc's habit of copying across the desktop file *(Desktop.Inf)* and any desk accessories (ending in *.Acc*), this is a benefit. For a start, it saves having to save the desktop to the Ram disc, as described in the last paragraph of the letter.

It also protects the user against 'clever but ill-behaved programs', which could (in order to free as much memory as possible) erase resident desktop accessories when they start, and re-install them on termination.

It also permits you to juggle such accessories more freely, safe in the knowledge that they can be re-loaded from your Ram disc if necessary. I am not aware of software which uses these abilities yet, but it is worth being prepared for.

However, contrary to Marvey's instructions, when you are using a Ram disc, the desktop is saved to it, and not to your floppy disc – and it is the Ram disc copy which is accessed on changing resolution. The solution is to get your desktop right using the copy on the Ram disc, then copy the file across to your

Puzzle

Puzzle No 242

"What's the next number in this series?" said Jamie to Ben, giving him a scrap of paper on which was written: 18, 24, 66, 74, 152, 179, . . . "It's a powerful problem," added Jamie, before leaving Ben to do some hard thinking.

Ben soon realised that this last remark was a clue and he had soon calculated some of the powers of the list of numbers. One common factor emerged from a list of the squares:

18	squared =	324
24	,, =	576
66	,, =	4356
74	,, =	5476
152	,, =	23104
and 179	,, =	32041

Each of the squares consisted of digits that were consecutive (though not necessarily in order).

Having found this property Ben was able to find the next highest number in the series. What is it?

Solution to Puzzle No 237

Answer: I arrived just as the clock was striking half past nine and left as it struck four. This meant that during my stay the clock struck 86 times.

In the program the action of the clock is duplicated in lines 40 to 80. Each time at which the clock strikes is represented by the variable *T*, which is incremented by steps of ·25 to represent the quarter hours. The actual quarter (*Type*) if found in Line 40: *Type=T–Int(T)*, the fractional part remaining indicating which quarter hour is striking. Lines 50 to 80 increment the chime total by the correct number.

The loop *VStart* represents each possible time of arrival, and a running total of chimes is kept as described above. After each quarter hour chime the running total is checked to see if it equals 86 and if so, the relevant figures are printed out. This procedure is repeated for a full 12-hour cycle.

There are 13 possible sets of arrival and departure times which result in 86 chimes being heard, but the question stated that if you knew the length of the visit you could find the answer. Only one of the 13 timings appears once, so this must have been the one in question. All of the other 12 timings are duplicated.

```
>
  10 DIM N(150)
  20 FOR VSTART=.25 TO 12 STEP .25
  30 CHIME=0:T=VSTART
  40 TYPE=T-INT(T)
  50 IF TYPE=.25 THEN CHIME=CHIME+1
  60 IF TYPE=.5 THEN CHIME=CHIME+2
  70 IF TYPE=.75 THEN CHIME=CHIME+3
  80 IF TYPE=0 THEN CHIME=CHIME+T
  90 IF CHIME<>84 THEN 120
 100 VISIT=T-VSTART:IF VISIT<0 THEN VISIT=
     VISIT+12
 110 PRINT VSTART,T,VISIT
 120 T=T+0.25
 130 IF T=12.25 THEN T=0.25
 140 IF T=VSTART THEN GOTO 160
 150 N(CHIME)=N(CHIME)+1:GOTO 40
 160 NEXT VSTART
```

Winner of Puzzle No 237

This week's winner is regular Puzzle correspondent Phil Amey of Claygate, Surrey, who'll receive £10.

Rules

The closing date for Puzzle 242 is February 8. Answers should include a program listing if possible.

boot disc, so that it will be used when booting up.

So, I stand by my original comments: that it is worth being cautious if your Ram disc turns up as drive C, particularly if you are debugging your own programs and may need to reset your machine. On the other hand, it is good to have an automatic copying of desktop and accessory files across to the Ram disc.

Howard Oakley
Isle of Wight

Missing link

Will you please supply the missing line from the Xen Plus program for Amstrad CPCs, which was printed in two parts in recent issues?

Part one finished at line 4000, and part two started at line 4400. The missing line 4300 gives rise to an *Out of Data* error and a check shows that the checksum is incorrect.

W A Googe
Stevenage

Our apologies to everyone misled by the missing line, which is:

4300 DATA 3E 03 CD 5A BB DD 5E 04

Editing the Plus 2

Your article in *Popular*, December 4, about editing problems with long listings for the Spectrum Plus 2 suggested that the fault is inherent in the 128 mode Rom, ie, it was stated that the Plus 2 is essentially a 128 with keyboard, etc.

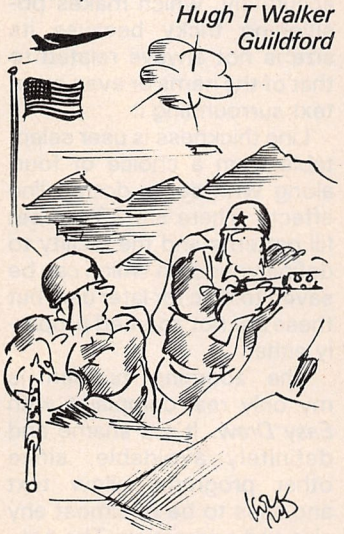
It is noteworthy that no such problem exists on my (Sinclair) Spectrum 128, nor were any such faults mentioned among the criticisms slung at that machine when Sinclair launched it.

The response from a reader which you published in Letters, January 1 is worthy of Amstrad itself. The idea that one should acquire the latest in the ZX80 family and proceed to program it like a ZX81 (in blocks of 100 lines) has a farcical ring about it.

Assuming that one has written one's Basic masterpiece and dutifully saved each block, when the moment of truth comes and they are merged together, what if something doesn't work or you wish to change something?

I defy anyone to produce a set of subroutines separately and have them work together without problems. Furthermore, anyone who has written a program will know that it is never 'finished' – there is always some way to make it neater, faster or more friendly.

Hugh T Walker
Guildford



"I bought this super-realistic simulation game and then my call-up papers arrived"

New Spectrum club

May I, through your magazine, inform all readers about a Spectrum club that's just for them, called the Computer Games Club. Due to the success of our ZX81 club last year which is still doing quite well, we have decided to start a Spectrum club for 48K, 128K and +2 users.

You pay one membership fee which lasts for one whole year and for that you will receive a free cassette which contains three great games when you join, plus four newsletters, four club magazines throughout the year and the chance to communicate with other Spectrum owners all around the world.

If readers would like full details about the Spectrum club or even the ZX81 club, then please write to me at the address below and don't forget to state which club you would like details for.

Steven Howlett
Computer Games Club
24 Beacons View Road
Clase
Morriston
Swansea SA6 7HJ

Game Two brought to book

Game Two in our Readers vs *Colossus* chess tournament returns after its Christmas break with a progress report and the latest moves.

When we last looked at Game Two, we commented that it had departed from book opening moves in the game.

Several readers have written in to say that this was not correct, and indeed Kasparov has apparently recently written a book documenting this set of moves (for details of the game so far, see below). Thanks for the information.

Your votes over Christmas for the latest Readers' move (playing White) plumped for taking the knight on b1 to c3. *Colossus*'s response was to move the d-column pawn forward.

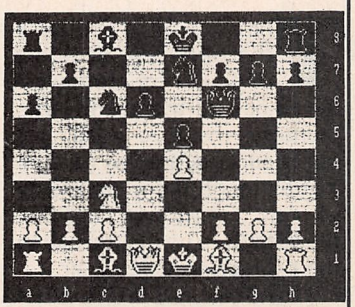
Your move please

Now we need your suggestions for the next move in the game. Send your move to *either* Inter-Mediates (*Popular* Chess), Freepost, Sawbridgeworth, Herts CM21 9YA (you do not need to use a stamp with this address), *or* *Popular* Chess, Unit 2, The Maltings, Sawbridgeworth, Herts CM21 0PG (with a stamp). Freepost is slower than normal mail, so if you want to save money on stamps, post your entry promptly. Entries must reach either address by Wednesday, January 28.

The move which gets the most votes will be entered into the game. Results and *Colossus*'s response will be published in two weeks' time.

Prizes

A British Museum reproduction Arran chess set will go to the person suggesting the most accepted moves at the end of the game. Five copies of *Colossus Chess 4* (available for most popular micros) will go to the most consistent entrants for the duration of the game. If you haven't entered before, start now, because it's not too late to be in the running for one of the prizes.



Game two

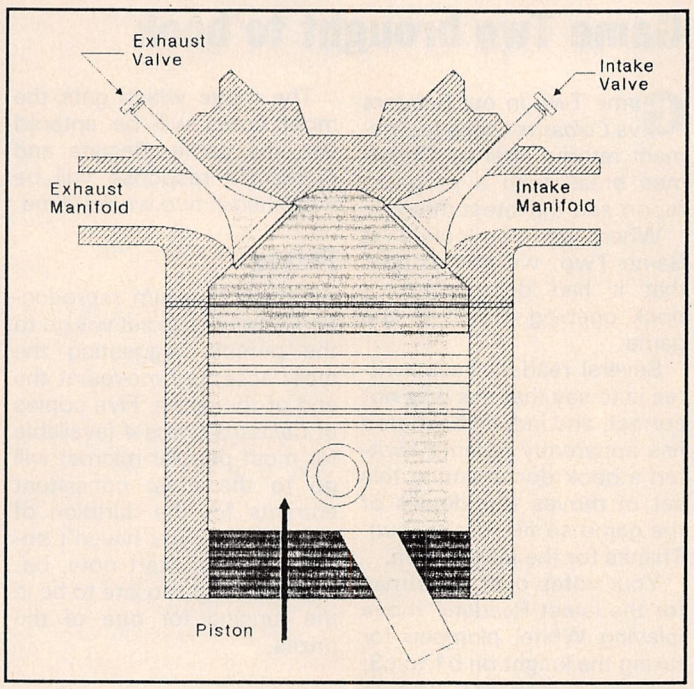
1	Pe2–e4	Pc7–5
2	Ng1–f3	Nb8–c6
3	Pd2–d4	Pc5xd4
4	Nf3cd4	P37–e5
5	Nd4–b5	Pa7–a6
6	Nb5–d6+	Bf8xd6
7	Od1xd6	Qd8–f6
8	Qd6–d1	Ng8–e7
9	Nb1–c3	Pd7–d6
10	?	

Correction

Unfortunately, the version of Robert Osborne's Sembler program for the Amstrad which appeared in the December 4 and 11 issues was not the fully debugged working one. The following lines should be typed into the main program to update Sembler.

```
260 IF A$="CAL" THEN PRINT "Call>";:PEN
1:INPUT "",A$:CALL VAL(A$):GOTO 230
420 IF VAL(A$)<>0 OR A$="0" OR A$="00" T
HEN POKE P,VAL(A$):GOTO 740
480 IF C$="" AND MID$(A$,I,1)>"/" AND MI
D$(A$,I,1)<":" THEN C1$=C1$+MID$(A$,I,1)
:T=I:X=T-LEN(C1$)
490 IF MID$(A$,I,1)="&" THEN C$=MID$(A$,
I,5):T=I+(LEN(A$)-8):X=I
520 IF LEFT$(C$,1)<>"&" THEN C$="&"+HEX$
(VAL(C$))
575 F$=""
590 IF MID$(A$,I,1)=F$ THEN I=200:GOTO 6
10
680 IF X=0 AND F$=" " THEN PEN 2:PRINT "
That is not an op-code.":GOTO 390
685 IF X=0 AND F$="," THEN F$=" ":GOTO 6
00
765 IF C<0 THEN C=65536+C
770 IF C<256 THEN POKE P,C-2:GOTO 800
780 IF C-2>=P THEN POKE P+1,C-P-2
790 IF C<P THEN POKE P+1,254-(P-C)
1140 C1=PEEK(P+1):C1$=STRING$(2-LEN(HEX$
(C1)),"0")+HEX$(C1)
1150 C2=PEEK(P+2):C2$=STRING$(2-LEN(HEX$
(C2)),"0")+HEX$(C2)
1160 PRINT C1$;" ";C2$;:X$=MNE$(X)+",&"+
C2$+C1$:P=P+2:GOTO 1070
1210 PRINT STRING$(2-LEN(HEX$(PEEK(P+1))
),"0")+HEX$(PEEK(P+1));
1220 IF PEEK(P+1)<127 THEN C1=P+PEEK(P+1
)+2 ELSE C1=P-(254-PEEK(P+1))
```

Going straight to the point



The Atari ST is probably the best deal in terms of power for money today, since its speed and large memory make it ideal for tasks such as graphic design. Yet although there are plenty of 'art' programs around, these tend to be of little use to the professional designer.

Easy Draw at £150 is either expensive to the home user or a bargain in the small business sector. The program all but fills up one disc and a library of example pictures is supplied on another. The manual is a slim, work-you-through effort, which is quite adequate as although it's a very powerful program, operation is so simple, it is almost intuitive.

The program will work happily in either colour or high resolution monochrome modes, and is very much in the technical drawing vein as opposed to art. In other words, the drawing tools are a mixture of geometric shapes rather than a selection of paint brushes and aerosol sprays. Even the most complex of pictures has to be constructed from the most basic of shapes; a house, for example, is drawn as a collection of doors and windows which are in turn constructed from panels, frames, handles and so on down to simply a collection of circles and boxes, etc.

This 'step' approach to drawing is the major difference between *Easy Draw* and other art programs. Everything you draw remains an individual shape, the shapes may be grouped together at any stage and then manipulated as one, but later on they can just as easily be ungrouped back to their original form.

In this sense you are not drawing a picture but rather assembling one. This makes the program very flexible, since having drawn your house it is very easy to enlarge or shrink it or perhaps just rotate the front door!

You may zoom in on any section of your drawing simply by 'dragging' a box around it. The program will then fill the window with a magnified version of whatever you 'boxed'. It is equally easy to move, stretch or enlarge the items in your picture.

Shapes can be positioned free hand or with the help of 'grid snap', which aligns them with the nearest points on the grid. The grid itself can either be shown or hidden, and may be set between 1 and 1/64 inch intervals, which makes drawing to scale quite easy.

Items may also be shadowed by the program to give them a three dimensional look, but this is limited to being only on the bottom and right hand side of the figure and only to a given depth.

Text is supported in a choice of four character sizes, with all the usual Gem features such as italics, underlined and so on. Unfortunately the program treats text quite differently to the shapes. It is impossible to rotate or zoom accurately, which makes positioning tricky because its size is not always related to that of the items or even other text surrounding it.

Line thickness is user selectable from a choice of four, along with some dotted line effects. There are 39 pre-set fill patterns and the facility to define your own which can be saved to disc for later use, but these are not zoomed properly either.

The 'zooming' problem is my only real complaint with *Easy Draw*. It's a shame and definitely avoidable, since other programs allow text and lines to be of almost any size and orientation. The non-zooming of the fill patterns stems from the fact that the fill function is provided by Gem. Perhaps a new and more suitable one should have been written for this program.

All printed output is handled by a different program, matrix printers are well supported and the groundwork for plotters and cameras is laid but not fully implemented. I obtained perfect results with my Epson compatible Brother first time.

It's a shame that output uses a separate program because this wastes time switching to and fro when making fine adjustments to your drawings. You shouldn't really need to do this that often once you've grasped the effects of the non-zooming problem.

In this sense the full page view is misleading and of no use when lining up text with objects or perhaps deciding on the density of shading needed. For these processes only the 'normal' view should be used.

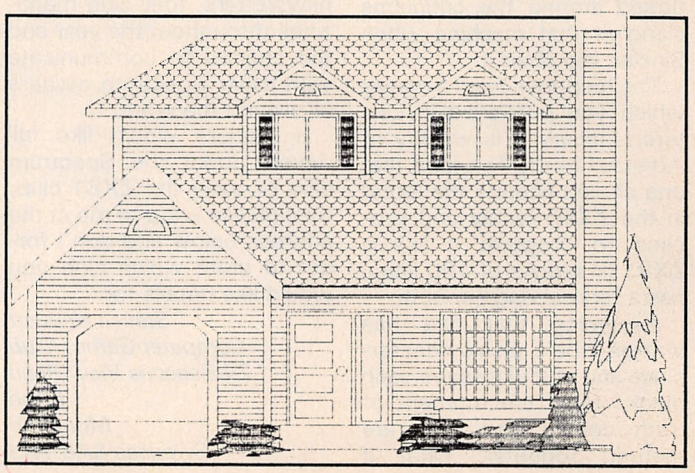
Verdict

On the whole, *Easy Draw* is a very powerful and therefore useful program, although I feel that some functions have been left out or curtailed, for instance, the text facilities are basic, the filling system crude, and perhaps a method of calculating the area of a shape would be useful. Importing pictures from other programs is also not supported.

Only two windows may be open simultaneously which may be annoying to some people, and if you want output from anything other than a matrix printer you should check first that this program can handle it.

On the plus side it works well with any screen resolution and is certainly fun to use. It's good at knocking out art work for posters or letterheads, but at £150 it's too expensive to be a toy and people doing real design work may find themselves wanting extra facilities.

Roger Howorth



Kick the spiders to death

Tony Kendle continues the tips for Piranha's Nosferatu, and has invaluable help for anyone stuck in Repton 3

We left you last week with a small taster of Chris Stoneham's tips for *Nosferatu,* by Piranha.

This week, Chris continues:

"The passage of night and day in this first part of the game seems to be a bit irrelevant, and there is ample food around to boost your health during moments of crisis, as long as you look in the right places. You are only allowed to carry two objects at a time which causes slight complications towards the end.

"You start off in an L shaped bedroom – leave through the door on the top right hand side. You are in a bathroom where you must dodge the spiders and get to the fireplace on the opposite side of the room. Here you will find some boots. Walk around with these on and you can kick the spiders to death. These are the only monsters that stay dead so it is well worth getting rid of them. Be careful when you go to kick as if you are not touching the spiders the boots will be dropped and can be hard to spot again on the patterned floor.

"From the second screen of the bathroom, leave by the door on the bottom left into a bedroom where you can get some food from a table. Leave again by the bottom left and you are in a long corridor room. Kill the spiders here. Leave by the top left into a new bathroom and kill the spiders here (there are some new boots hidden in the loo if you have lost the old ones).

Chris goes on, "the bottom left of this bathroom leads to a double bedroom where you can find a lamp and some food. (If you were to go to the bottom right you would find a gun and a lamp. The gun can be used to kill bats but it is very difficult to use and I find that you suffer more damage by hanging around than if you just made a run for it.)

"Leave the bathroom and go back into the long corridor. Don't worry about the crucifix as it seems to have no real use. At this point you should also drop the boots as they have no further use. Leave the long corridor at the bottom right and charge left and down the stairs, dodging the bats as best you can.

"At the bottom of the stairs run left until you see a door on the bottom right. This is the dining room. You should make it with a little energy left. In here you should move to the right hand side and move down the wall until you see a sword on the wall. Take this sword and from now on all of the doberman pinchers (sic) will leave you alone.

"Check the second fireplace on this wall. Now you can go down the middle of the table to eat all of the food you need. If you drink the wine you end up rather wobbly on your feet and can't get near the rats with your sword."

This time we'll leave you eating the food until next week, when Chris's tips will go on, because I want to include some help from Darren Stewart on *Repton 3.*

Repton 3 is a game that had me captivated over Christmas, I'm sure you all know that the original *Repton* was probably the best of *Boulderdash* derivatives, one of those games of logic more than skill that require you to collect diamonds from underground mines dodging falling boulders and an assortment of monsters. The skill lies in deciding how piles of boulders will fall when disturbed and avoiding being squashed or trapped.

Repton 3 is distinguished by having more screens and more monster types (including an ever-growing fungus) to challenge you. It is also noteworthy in that its author, Superior Software is converting the game for other micros.

I'm sure that anyone who has played the games will therefore be as pleased as I was to see Darren Stewart's complete breakdown of the passwords of the game. There are three parts to the game and eight passwords to each level of each part, although you don't need to enter the first one.

Screen	Prelude	Toccata	Final
A	Prelude	Toccata	Final
B	Citadel	Upstart	Enliven
C	Morning	Octagon	Contest
D	Awkward	Chaotic	Illegal
E	Fritter	Majesty	Appease
F	Lawless	Revenue	Student
G	Ration	Forsee	Average
H	Tobacco	Reserve	Phoenix

I would be delighted to see maps and solutions for this game from anyone who has completed it.

Charts

Top Twenty

1	(1)	Gauntlet	US Gold
2	(8)	Paperboy	Elite
3	(7)	180	Mastertronic
4	(4)	Footballer of the Year	Gremlin Graphics
5	(3)	Space Harrier	Elite
6	(11)	Ollie and Lisa	Firebird
7	(10)	BMX Simulator	Code Masters
8	(5)	Konami's Coin-op Hits	Imagine
9	(9)	Trivial Pursuit	Domark
10	(12)	Five Star Games	Beau Jolly
11	(2)	Computer Hits Vol 3	Beau Jolly
12	(6)	Hit Pack	Elite
13	(15)	Breakthrough	Data-East/US Gold
14	(–)	Agent X	Mastertronic
15	(17)	Head Coach	Addictive Games
16	(–)	Flash Gordon	Mastertronic
17	(14)	Scooby Doo	Elite
18	(–)	American Football	Bug Byte
19	(–)	Speed King II	Mastertronic
20	(19)	They Sold a Million (3)	Hit Squad

All figures compiled by Gallup/Microscope

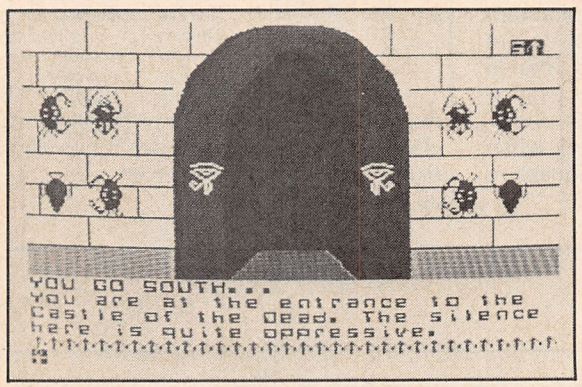
Help is at hand

Tony Bridge devotes this week's corner to answering cries of help from lost adventurers

See-Kah of Assiah was one of the first programs from Mastertronic, and I must admit that I still have a shot at it from time to time. It's a graphic/text adventure, and although the graphics probably have not held up too well when compared with present efforts, they serve the purpose and make for a nice change now and then.

Kevin Kelly has been battling with it too, and wants to know how to get the casket from the mesh and the rod from the ice. To get the rod, you must of course melt the ice, and this is achieved by first opening the red valve while wearing the cloak and carrying only the cloak.

Now open the green valve and hey presto! the ice melts. As for the casket, you'll need the blowpipe; this will help you breathe (poke it through the mesh), and as you'll be underwater if you can see the casket, this is a good thing.



See-Kah of Assiah – an oldie but goodie

Kevin also asks about *Mystery of Silver Mountain,* which he is playing on his Spectrum (how does he cross the bridge and what is the stone circle for?) – I don't know about this one, so if you can help him, why not contact him direct at 30 Poplar Place, Blantyre, Glasgow G72 9QA?

From Beaconsfield comes Nicholas Sweetman, who is having a *Pub Quest* at the moment – but he can't get across the road at the pelican crossing. It's a long time now since I played this one myself, but I dimly remember having to press the button to get the traffic to stop. It is, if I remember right, one of those sometimes frustrating adventures that makes a big production of *how* objects are used ('unlock door, open door, enter door' and so on); nothing much wrong with that, I suppose (*Dracula,* over which I enthused a couple of weeks ago, displays the same kind of literalism), but it can sometimes be annoying to find that the answer to the great problem is something as easy as *Push Button!*

Of course, I may be completely mistaken after all that, but try it anyway, Nicholas, and see if it works. Again, if anyone would like to help Nicholas through the *Quest,* his address is 52 Baring Road, Beaconsfield, Bucks HP9 1RF.

Catherine Holland of 36 Norman Road, Mirfield, West Yorkshire WF14 9SR, is playing *Never Ending Story,* Ocean's adventure. She's managed to persevere a lot longer than I ever did, and has reached the web in the second part. Apparently, she has tried cutting it but found that this didn't work – your instincts were right here, Catherine (and it's always a good idea to cut a web), but you must be carrying the *small* knife from the kitchen in order to get through.

To find the kitchen, first get to the ruined building, then go down, southeast and west to the ruined building, then go down, southwest and west to the well. Then east and south will bring you to the kitchen. Incidentally, the tin that you might find nearby will come in useful when you meet some rodents, though I'd hate to keep *that* sort of stuff in my pantry!

As for *Lord of the Rings,* Catherine – well, "any help gratefully received", you say, which is a little vague.

Keep your strength up

There have been many thousands of words written about this story, which should have been the greatest event of the decade, nay, the century, for us adventurers; it wasn't. But what sort of help to give you, Catherine, I'm not sure.

As a general guide, you must ensure that your strength is kept up throughout the tale; you can do this by eating, and you should have plenty of opportunity to do this. The black riders are a constant source of sudden death to the unwary – just remember, *don't* attempt to escape to the east or west if they appear (keep in mind that in the book they appeared on the east west road).

If you visit Farmer Maggot's farm, *Wait* three times when the dogs arrive, and finally, light the candle *before* entering the tunnel.

This last is accomplished in the same way as operating the pelican crossing in *Pub Quest;* that is, in painful detail! You must first of all *Open Matchbox,* then *Light Match* and only then can you *Light Candle* – but you must also add *With Match.*

A similar situation is found with the tobacco and pipe. Although it isn't necessary to completing the game, you can have a quiet smoke and this does, I suppose add to the atmosphere (I would like to, just once, be able to *live* an adventure and exist *within* a scenario, but I suppose that this would be impossible without a huge increase in the average memory of home computers. But you must *Open Pouch, Fill Pipe* and then *Light Pipe (With Match).*

Turn handle

Using the ferry is boredom of another sort, I've always found just a tedious round of *Turn Handle, Turn Handle.* This is complicated by the fact that everyone very rapidly gets exhausted and can't turn any longer, which is another good reason for keeping strength up by noshing as often as possible (and remember that there's almost nothing a Hobbit enjoys more than a good meal, unless it's a pipe of pipeweed).

Anyway, all this complicated manoeuvring and the general slowness of the whole thing is one of the reasons why I've never persevered to the end of *Lord,* one of the few stories I've looked forward to for many years. However, I have several people to thank for drawing my attention to the fact that there *are* some good puzzles in the adventure, so it's worth sticking at it.

One of my very reliable sources of excellent adventure advice has been John Wilson, and I have him to thank for much of the *Lords* advice – he is unfailingly willing to supply the same advice to other players, as long as they send an SAE to him at 26 Spotland Tops, Cutgate, Rochdale, Lancashire OL12 7NX.

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– Excellent mail order service . . . Worthwhile and authoritative help . . . Wealth of information for the adventurer. (9 January 1986)

*** MIKE GERRARD:**

– I can recommend them even more than I did a couple of months ago. (*Dragon User* – October 1985)

– The news that Pete Austin's just agreed to be their President is a feather in their cap, so if you fancy reading his monthly column in the Club Dossier, give them a ring on 01-794 1261. (*Your Sinclair* – May 1986)

– The Club does give very good value for money. (*MSX Computing* – April/May 1986)

*** BILL BROCK:**

– Probably the best known independent is ACL . . . This is a more professional set-up . . . Those concerned with ACL are all avid and dedicated adventurers – why not write and get some more gen on your favourite pastime (obsession). (*Amstrad User* – May 1986)

☆☆☆ Touchdown ☆☆☆

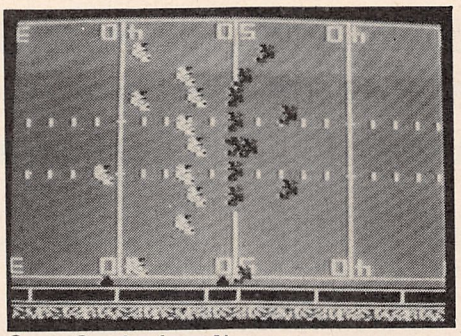
The definitive survey of the American Football computer simulations on the market

Yo! It's Superbowl '87 – with the awesome New York Giants defense facing up to the Denver Broncos, led by the injured John Elway. Who will succeed in taking the crown? (The *Popular* money is on the Giants.)

This week we present the definitive guide to American Football micro games available in this country, both home grown and import. The action without the aggro. The plays without pain.

All the games available can be put into one or two groups. Either the full blown strategy games, where you simply (or not so simply) enter the type of play you wish to make, then watch the action unfold automatically on the screen – call it the Coach approach if you like.

Alternatively, you have the games where not only do you call the plays, you then have to control the quarterback and receivers via joystick to make it work! That's the On-Field approach. Take your pick . . . each has its advantages and disadvantages.



***Super Sunday* from Nexus**

Coach

Super Sunday – C64/IBM PC

This is the game released by Nexus in the UK, licensed from Avalon Hill in the States, in which you can replay a selection of Superbowl finals over the last 20 years (one or two player – or watch the computer play itself) up to 1985.

Alternatively, you could always create your own match-ups, say one of the mid-seventies Dallas sides against your favourite – how about the wonderful Washington side of '83?

The first thing to be said about *Super Sunday* is that it is very easy to get into, without being so simple that it soon gets boring. When playing offense (if you are

The Popular Guide to American Football

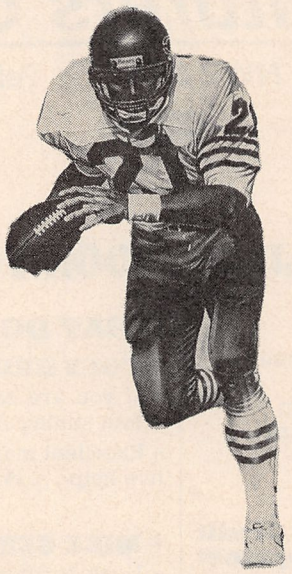
Are you embarrassed to admit that you don't know a safety valve from a button hook? Do your closest friends hoot when you display ignorance by cheering for Wolverhampton Wanderers at their Superbowl Party? If you have to answer 'yes' to either of these questions, then you need to read the *Popular Computing Weekly* guide to American Football.

1) What is American Football?
American Football is a derivative of that very British game, Rugby League. It is played with a rugby ball on a pitch 100 yards long with one team of 11 men playing left to right, and the other opposing them.

2) What is the aim of the game?
The aim of the game is to get rich. You do this by scoring more points than the opposition.

3) How do you score?
By carrying the ball across or catching the ball beyond the end of the pitch you are running towards. This is a touchdown, and scores six points. Following a touchdown, the cheerleaders jump around. You also get the opportunity to score an extra point (or conversion) by getting the smallest person in your team to kick the ball between the goal posts. Kicking the ball between the posts at any other time is called a field goal and scores three points.

4) Why do the players wear all the helmets, padding and stuff?
It looks neat.



5) If there are only 11 players in a team, how come it takes a fully laden 747 to take them to an away game?
Although only 11 players from each team are allowed on the field at a time, there is unlimited substitution, so effectively, each team has three sub-teams the attack (or offense), the defense and the special team (they come on when the ball is kicked). This adds up to about 50 persons in the locker room . . . then you have the camp followers. The head coach (manager), lots of assistant coaches (trainers), assorted underlings (tea boys), medics (doctors) and most important of all, the team psychologist.

6) How is the game played?
When your side first has the ball, you have four chances (downs) to get the ball 10 yards upfield. As son as the ball carrier is tackled (hammered) the play stops. If you succeed, you get another four goes – and so on until you either score or lose possession (via a fumble or interception).

7) How do you get it upfield?
Either by giving it to a player, then pushing everyone else out of the way so he can run up the field (rushing), or by waiting for some players to run forward from the line of the scrum (scrimmage) then throwing the ball to them.

8) What is a 'play'?
A play is a pre-planned series of moves that are designed to move the ball up the field, or score. There is more choreography in a game of American Football than the whole of the first act of the Nutcracker suite.

9) Who is the most important player on the field?
The most important player is the quarterback, who shouts out the particular code for the play to the team, and will either throw the ball to a receiver or give it (hand it off) to a runner.

10) Do I know enough to be hip now?
Almost – but to make sure, jump around shouting, "Red fifty-three, red fifty-three," put a thick band of mascara under your eyes and wear jodhpurs.

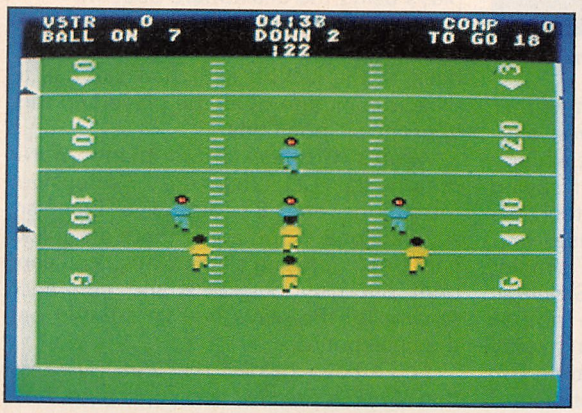
John Cook

not familiar with any terms, read the *Popular* Guide to American Football, below) you are presented with a choice of three passing plays (short, long or flat), five running plays, plus a punt, field goal and fall option.

Now you choose a scrimmage formation; one of three. Next you pick your quarterback and then the pass receiver or runner – depending on what you decide to do. On these screens, each player's performance statistics are displayed, which give you some idea who to opt for on the big plays.

On defense, you either set up for the run, the pass, or play a formation that is somewhere in between. Now you go onto a screen that will let you select some special defenses. Is the opposition going for short yardage — play that six-man line. Passing? Blitz the quarterback!

Now press a button and watch the action being played out before your eyes. The graphics are not going to knock your socks off, but the side-on perspective is quite effective as the



Super Sunday

matchstick men run around.

Super Sunday has faults. Sometimes the screen graphics don't match up with the 'real' situation as shown by the main screen. Each play runs a set gametime of 30 seconds (a bit off for aficionados), and the computer doesn't use timeouts intelligently.

But it's the attention to detail that makes it the best of the strategy games.

Headcoach – Spectrum/CBM 64

Having cleaned up in the soccer manager market, Addictive Games has now applied its expertise to American Football. *Headcoach* is the result. Unlike everything else now available, *Headcoach* lets you direct a team throughout an entire season, hopefully culminating in playoffs and a trip to the Superbowl.

The game cycles through a weekly routine which starts with sending spies out to anaylse the strengths and weaknesses of the opposition before you have to make your team selection.

Once a team is selected you go out onto the pitch to play the match, taking good note of the weather conditions; it's bad news trying to play a passing game when there's a gale blowing. Unfortunately the way the games have been implemented is very disappointing as you can only select offensive plays from pass, run, line plunge and kick field goal. Yes, you can't even punt the ball.

Next travesty, instead of having four downs to gain 10 yards, you only have two and plays result in gains in multiples of five so that the single character sized graphics can leap one space along.

Having dispensed with the opposition (or not as the case may be), you get to see your league standing before going into the trading section. In this, other teams offer you a player to swap for one of yours, sometimes with a draft choice thrown in as well.

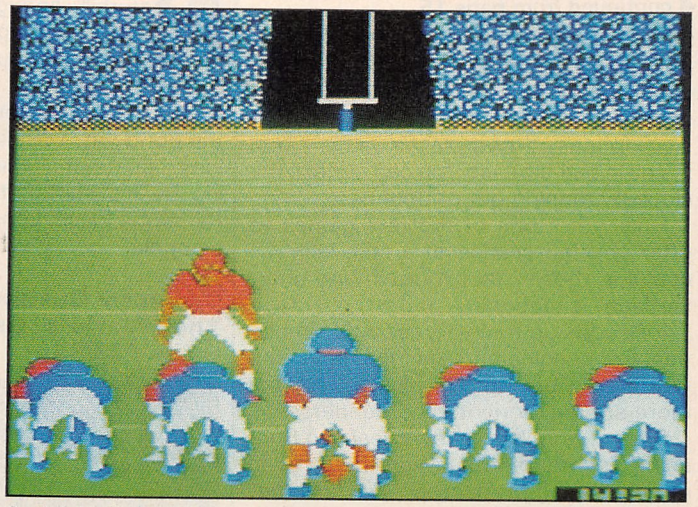
American Football – CBM64/Spectrum

Originally released about two or so years ago under the Argus Mind Games label, *American Football* now turns up as a Bug-Byte £2.99 cheapie. Just as well, really, as it's beginning to show its age – and how.

Once again with either one or two players, you select offensive options and/or defensive options then watch the play develop on the screen. But it's just not done to the same level of competence as *Super Sunday*. You are limited to one of eleven offensive and four defensive plays. Not that much fun.

You can't change the teams around at all – or nominate particular receivers. The graphics are very small and it's not always obvious what's going on.

It's the only game of this type on the Spectrum, and for £2.99 you won't feel cheated – even though you might hope for a little bit more. How about typing *Popular*'s Superbowl game in instead?!



Activision's *GFL Championship* (see p 16)

On-Field

On-Field Football – C64

The first reaction of most people on seeing *On-Field Football* is, "Short of players, isn't it?"

Well, at four-a-side, you could be forgiven for thinking that . . . until you play it. Because four men is enough to give you all the action essentials.

Think about it. You need a quarterback, to make the passes and running plays; a wide receiver to catch passes; a tight end to catch or block on running plays; and a centre to snap the ball and protect the quarterback. But what makes *On-Field Football* so outstanding is the fact that it's the nearest thing to arcade action in the genre.

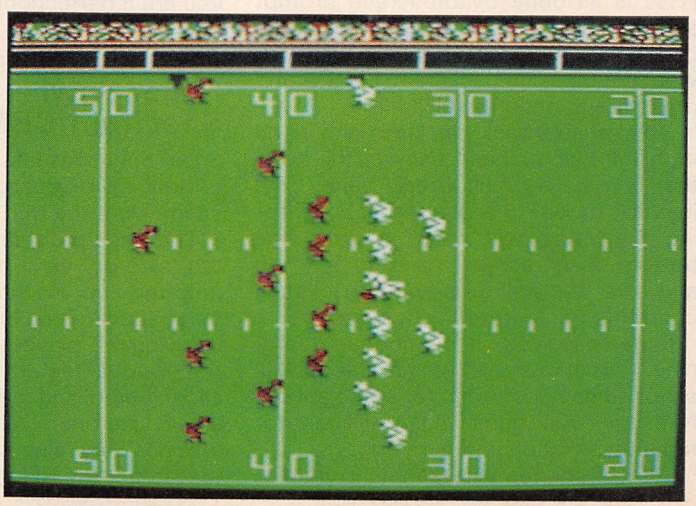
The graphics are clear, bright, colourful and exceptionally fast and smoothly animated. All control is via the joystick and you really do control the players.

Having selected your play, it's up to you to execute it, first moving the quarterback to run or pass, and if you pass, control switches to the receiver.

On defense, you control the formation, and then take command of the free safety, helping out on the line, hanging

continued on page 16 ▶

On-Field Football



Superbowl special

◀ continued from page 15

back to stop the pass reception, or pounding after the quarterback on a blitz. Other features include more than 16 offensive plays, almost limitless defensive options, a two-player game – and it's all in real time, so you can control the clock by running out of bounds.

Finally, it's one of the few games to offer you the chance of a fake kick . . . useful in those "fourth down and short yardage" situations.

It all adds up to a very realistic simulation. For genuine gridiron fans, it may be worthwhile buying this plus one of the more strategic-oriented contenders.

But . . . hold hard. News reaches Sunshine Towers of what might be an even more amazing product. *On-Field Football* was programmed for Activision by Gamestar. From this same source comes a screen shot that suggests it may be surpassed.

GFL Championship Football has all the hallmarks of a true Superbowl champion – great graphics, 34 offensive plays, 12 defensive formations, and 27 different computer-controlled teams.

Of course, you can't pin too much on a screen shot and a press release. But we have faith in this one. If the gameplay is up to scratch, and the graphics live up to expectations, *GFL Championship Football* is going to be 1987's clear winner.

Sadly, it won't be around in time for Superbowl, but Activision says it will be released at the end of February. Look out for a review soon.

Touchdown Football – C64

This one made it over here about a year ago, from Electronic Arts, via Ariolasoft. At the time it made little impression on our sports fans, but looking at it a second time – it's not half bad.

Another real-time simulation with one/two player and auto play options, you hold the hand of destiny over a team of six players, all under joystick control.

As offense, you select one of seven scrimmage formations, then tell the left and right receivers which patterns to run. (This is all done by on-screen prompt and moving the stick in the appropriate direction). Now decide which way you want the three linebackers to block – and press fire to snap the ball.

Your quarterback can now either run with the ball, or hang back in the hope that a receiver will break clear. The joystick moves the quarterback, pressing fire once will pass towards the bottom of the screen, twice for the top and after the ball is in the air, joystick control is transferred to the receiver.

In defense, you simply choose one of nine formations and when the ball is snapped have control over a free safety. Naturally, the game has facilities for timeouts, kicking and punting.

All this sounds very simple in theory, but – just like the real thing – once you try playing *Touchdown*, it becomes obvious that a great deal of timing and practice are needed to do well.

Graphically similar to *Super Sunday*, but not quite as fast or as immediately playable as *On-Field Football*, this is still worthy of consideration – particularly if you are a perfectionist.

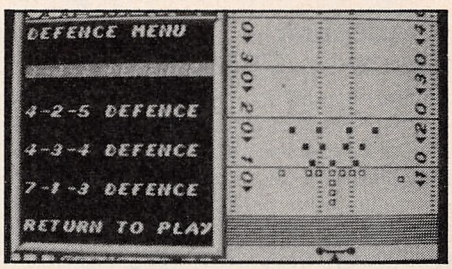
Super Bowl – Spectrum/CBM 64

Super Bowl was last year's home grown offering from Ocean, with official authorisation from the NFL.

The Kaos programming team rejected the 'side-on' view of the action, preferring the 'up in the Goodyear airship' perspective. This has the advantage of allowing 22 players on the field. It has the disadvantage of having to plot them all, real-time, and making them very, very small. Like one pixel small.

Super Bowl also suffers from the fact that to get the NFL 'official' tag it had to approximate to realistic speed. American Football is only played at one speed. Fast. When that is scaled down to less than an inch on screen – it's too fast.

All the ingredients of a good game are there, as you select plays and defense



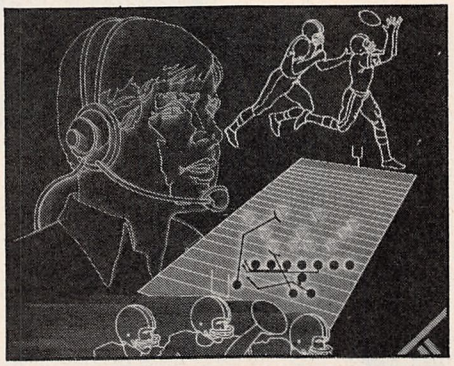
Ocean's *Superbowl*

from a series of sub-menus. The defense can even select man to man coverage on each of the offensive players.

With some neat programming, but lousy design, avid Spectrum fans might still like it at a push, but are going to have to carry on waiting for a truly great Football game on their computer.

Naturally enough, the good 'ol US of A has originated quite a number of computer games based on American Football – many of which haven't officially found their way over the pond yet. We dispatched Mark Jenkins, initiate of all things American (judging by his shirts), to Pilot Software in Rathbone Place, London WC2, to try out a couple.

Computer Quarterback £35.95 The World's Greatest Football Game £33.95



The World's Greatest Football Game

One point to keep in mind is that neither of these programs will teach you anything about the game you didn't already know – which is a kind way of saying that if you don't already understand the game, they won't make any sense.

First let's look at the rather simpler *Computer Quarterback* from Strategic Simulations Ltd. *CQ* is a real time football game simulator which allows you to play a game over whatever period of time you have selected. You're given a choice of Semi-Pro or Professional two-player versions, or a one-player version against a team sinisterly known as 'The Robots'.

Semi-Pro *CQ* features 18 offensive plays and 14 defensive plays, although it's emphasised that the software ensures a different outcome even if two players use the same plays repeatedly.

As a computer game it's pretty unabsorbing, but on the plus side, *CQ* does come with charts of pro and semi-pro offensive and defensive plays (including such gems as the Flea Flicker).

On, then, to *The World's Greatest Football Game* from Epyx, which at least looks modern. It's covered with flashy icons and is divided into two main sections which will allow you to design plays (the Chalkboard) and then carry them out (the Play Game page).

The opening option is again for time per quarter, from one to 15 minutes. You can enter team names and kick off to begin play. You then select the direction and type of starting kick and subsequently a possible play is shown on the screen in diagrammatic form. You can accept this play, use the garbage icon to choose another or design your own plays using the chalkboard section.

After choosing offensive and defensive formations the OK icon takes you back to the kickoff screen which has a nice little picture of all the players in the appropriate positions.

World's Greatest offers many more options than *CQ* – there are 27 offensive formations and 87 offensive receiver routes alone – and again there's a thick handbook detailing all the plays. You can print out play diagrams and edit and rename all the plays you've created on the chalkboard.

You'll have gained the idea by now that *World's Greatest* is complicated, but at least it looks good and manages to hold your attention while all the possible options are slogged through.

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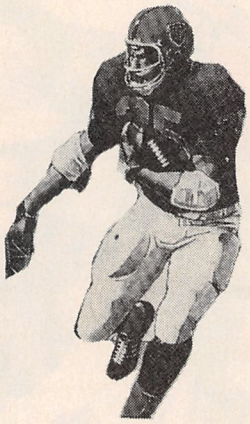

Normally this hardback volume costs £8.95, but we're giving away ten to the winners of this not-so-difficult competition.

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Kaboom!!

Why are there certain shoot 'em ups which make you bounce around in your seat, going 'Aiarrrr!', 'Pee-owww!' and 'Kaa-BOOM!' until somebody a) unplugs your Commodore or b) unplugs you?

The grand-daddy of all these games was *Uridium*, and though it's still not looking in the least long in the tooth, there's been a rush of suitors for its crown. *Erebus* replaces flying over dreadnoughts with a mission over – and into – the planet of the title.

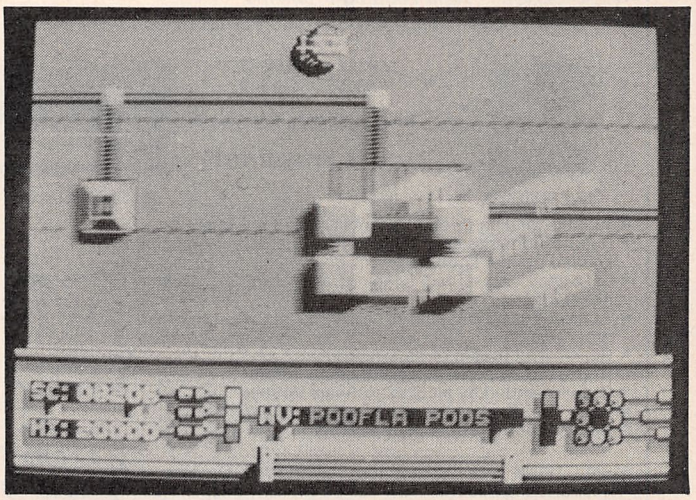
Stage one is a fairly simple shoot round the desert surface, before you descend into the refinery complex. Covering ground is more important than actual mass destruction to get the ducts to open but if you want to rattle up a hero's score you'll probably stick around, knocking out the waves of fighters, just as with *Uridium* you never landed immediately, but stayed aloft to give the aliens hell.

Once inside the planet things get tough as the obstacles mount up, leaving less space for manouevre and adding the need to shoot out barriers.

In between each level you get a bonus game – a fast shooting thirty seconds during which the aliens throw everything that they've got at you.

Despite the *Uridium* similarities, *Erebus* offers a few attractions of its own, not the least of which is your spherical craft, which takes a while to accustom yourself to its handling, as it gently rolls from side to side.

Not a great original then, but a change from the Hewson classic for dedicated alien blasters, with some imaginative graphics that just make you try again and again to reach that next level.



Blurringly fast

Popular Appeal ♦♦♦♦
John Minson

Program *Erebus* **Micro** C64 **Price** £8.95 **Supplier** Virgin Games Ltd., 2/4 Vernon Yard, Portobello Road, London W11 2DX.

Arcade atoms

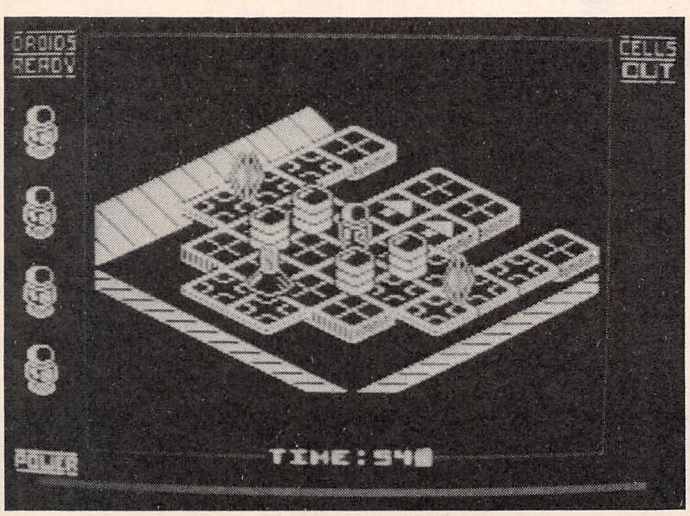
When I write my major work on computer games there will undoubtedly be a chapter on the influence of Chernobyl on blurb writers. The isotopes have melted down to the bargain basement now, as Atlantis sets us off in search of unstable 'nucleo' cells.

It's a while since we've heard from this company – I was wondering whether they'd gone the same way as the legendary city that gave them their name! But this is a pleasing budget title, and though it's in Ultimate-style 3D, it reminded me of *Highway Encounter* than the Ashby wizards much-copied offerings.

The 'nucleos' are hidden in mazes of interlinked rooms, through which you drive your droids, avoiding a number of nasty problems. There are sliding floors, moving platforms and wandering mutant droids. But are there also drums and blocks, which you can use to block the little blighters for a while. There's also a time limit to keep you on your toes.

The screen is framed by status information, which results in the characters being rather small, but the game is highly playable – so much so that I went back for more. And it's a nice touch that if you choose the Hard mode you get a considerably different – and much more complex – game!

One of the best to surface from Atlantis.



Popular Appeal ♦♦♦
John Minson

Program *Nuclear Countdown* **Micro** Spectrum 48K/128K **Price** £1.99 **Supplier** Atlantis Software Ltd., 28 Station Road, London SE25 5AG.

Where there's a will . . .

Here's another cheap and cheerful game from the Silver Range *Megabucks.* As Rock Carrington, you must explore the mansion of Maxibillion III and gain your rightful inheritance.

The game is set in the grand old tradition of *Spellbound,* with your little man moving left to right from room to room. Manipulation of objects is achieved via nested menus – the neat little graphics that these contain allow you to pick up and drop objects, pause the game, take inventory and so on. From the inventory menu, objects can be selected for use, though it's up to you to decide how to use them.

The screen graphics are very well-done and the front end is worthy of games two or three times the price.

Many little details catch the attention; a note-pad which contains cryptic help at each location, the tape recorder which allows for game save and load, the map which is presented after the game to show your progress and percentage completed, the telephones that allow for rapid movement between sections of the map and the slow disclosure of the complete will.

The puzzles aren't too hard, but you'll find plenty of hours flashing past as you wander to and fro in the mansion – a couple of pounds very well spent, methinks.

Popular Appeal ♦♦♦♦
Tony Bridge

Program *Megabucks* **Micro** Spectrum **Price** £1.99 **Supplier** Firebird, 74 New Oxford Street, London W1.

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POPULAR Computing WEEKLY
SPECIAL supplement
1987 Jan 22-28

Give your micro print power

It's all very well sitting hours on end, absorbed by the on-screen creations of your computer, but there will come a time when you will want to show the results of your efforts to another human being by other means than gathering the crowds around the telly.

The chances are that is going to mean an investment in a printer. In fact, it might seem strange in the days of the so-called 'paperless office', but in terms of upgrading your existing basic system, a printer may well be your first choice of peripheral. Which might lead you to ask – why?

A printer is not going to load and save your data faster and in greater quantity, like a disc drive. A printer is not going to connect you to the big world of on-line communications, like a modem. But it can aid you in a number of ways that you might find more relevant to your situation right now.

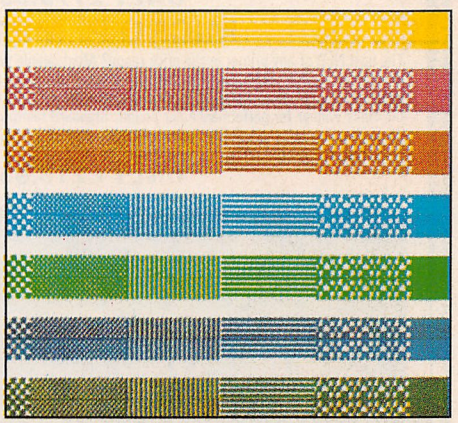
For starters, our last Readers' Survey revealed that 20 per cent of readers used their home computer as a word processor, for simple correspondence and the like. And for that you need a printer.

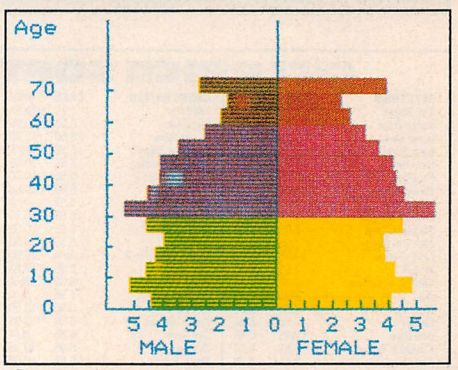
Writing using a word processing system is much easier than using pen and paper, or even an electronic typewriter, so much so that most professional writers use them. With a good word processing package, you'll find the way you can alter, store and retrieve text a real revelation.

But no matter how much fun you have, you'll need a printer to send the finished product out to the intended victim.

Even if you intend to become the world's best programmer, you're going to find a printer useful. Say you've just found a bug in your 2000 line state-of-the-art program. Trouble is, you can only display 20 lines or so on-screen at a time. What you need is a printer. Ask any serious programmer – they'll tell you much of their time is spent pouring over 'hard copy' (jargon for computer printout), not staring at the TV screen.

Maybe you've stumbled over a neat art package, and you intend to become a computer artist? Ever tried framing a vacuum tube? You'll need a printer. And if you're contemplating using the new found computing power for anything associated with business, a hard copy is essential with any serious accounting or database work.





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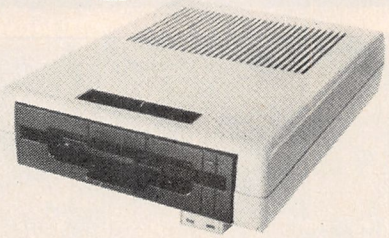

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Unit 111 (Rear), Washington Road, West Wilts Trading Estate, Westbury, Wilts.

There are five major groups of printers on the market, each with their own advantages and disadvantages, so before spending any of your hard earned dosh, think hard about what you'll be using your printer for.

Thermal

Thermal printers create an image by heating specially coated paper. **Advantages** - Cheap, no ribbon to replace. **Disadvantages** - Tend to be slow, print quality mediocre, special paper tends to be pricey.

Dot-Matrix

Here the letters/images are created by a printhead consisting of a matrix of pins (usually 9 × 5) striking an inked ribbon in such a pattern as to construct a letter or symbol. **Advantages** - Prices vary, but start cheap. Print quality OK (particularly if it has a letter quality mode), fairly fast. Can also print graphics/screen dumps, and a variety of typefaces. **Disadvantages** - May lack correspondence quality. Most are irritatingly noisy.

Daisywheel

Acts like an intelligent typewriter - in fact, if going for this option, you might consider buying an electric typewriter with a computer interface built-in. Creates letter by striking an inked ribbon with a fixed raised surface, just like a 'normal' typewriter does. **Advantages** - Produces letter quality print. **Disadvantages** - Large, fairly expensive, slow and noisy. Cannot produce graphics or alternative character sets easily.

Printer/Plotter

These produce an image by using pens, usually controlled by a sophisticated system of pulleys. **Advantages** - Can produce excellent line drawings and graphs, often in more than one colour. **Disadvantages** - Slow, and inadequate when dealing with text.

Inkjet

Here electrostatically-charged ink sprayed directly onto the paper, with the image controlled by electrostatics. **Advantages** -

Popular's rea

In a survey c

Dot matrix

program. BA

educators,r

Daisywheel

a generic applica
that are common
compared to App

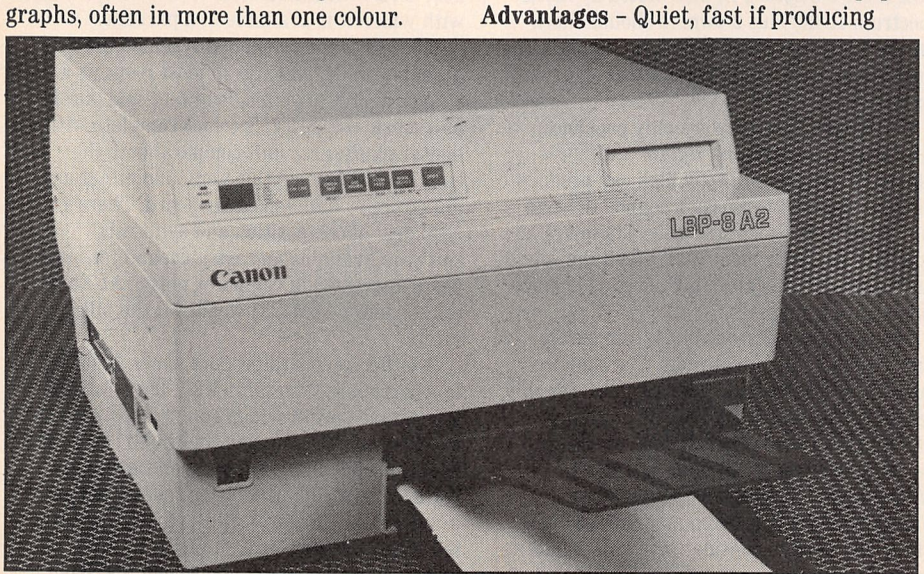
Laser

All samples increased to twice normal size.

Very quiet operation with a speed slightly faster than the average dot matrix. Reasonable print quality. **Disadvantages** - Fairly expensive, difficult to get hold of.

Laser

Similar in operation to a photocopier. Laser changes charge on drum which then picks up 'toner' where indicated. This image is transferred to the sheet of paper. **Advantages** - Quiet, fast if producing multiple copies, almost typeset-quality resolution, many type styles available, can produce high quality graphics. **Disadvantages** - Expensive - starting at £1,200 minimum. Bulky - around the size of a normal photocopier.



Laser printers: highest quality but at the highest price.

Print problems

You've got your printer and computer connected up and are eagerly waiting for the off. Stop. Turn the appliances off for five minutes and first look up the relevant pages in your computer's manual and have a good read.

Be sure you understand the commands you can use to activate the printer port - they'll vary from machine to machine.

Now go back and load a short Basic program (anything will do) and instead of running it, try listing it to the printer. If nothing happens, check the staggeringly obvious things (is the printer switched on? is it 'on-line'? is it connected to the computer?). If it still doesn't work - it's back to the manual.

You shouldn't have too many troubles - and once you've mastered basic listings, you're ready for greater things.

Like escape codes.

Escape codes have made grown men cry. Escape codes have caused more nervous breakdowns than Friday the 13th Part 2. Yet the use of these mystic codes can make your printer much more versatile. They work like this:

Inside the printer there is a lot of software devoted to decoding the electrical messages it gets from the computer. There is another lot that is there waiting to be activated by you. This is the stuff that will make the print bold - like **this** - or italic - like *this*. Even half height, or condensed, or letter quality, or alter the margin width or the line spacing.

Often, commercial software will do this for you, and you'll never have to worry about them, but often you're on your own.

Each printer will offer different features, but just flick through the printer manual and try following a few of the examples. Usually, the software is activated by sending the signal Chr$(27), and then a series of numbers or letters. A few hours' experiment here will reap dividends.

Dip switches are another bane of users. These tiny switches are usually hidden away somewhere in your printer's innards. The only advice here is to read the manual. It will explain what each does - you might even find some of them useful!

Other tips you might find handy - keep a dust cover on the thing, don't rest your coffee on its lid and don't keep it turned on when not in use. And if you're rewriting *War and Peace*, don't forget to buy a spare ribbon.

The music machine

The development of affordable microprocessor technology has made as much impact in the field of music as it has on home computing. In fact, it's probably true to say that there isn't a decent recording studio in the world which cannot boast some form of computer, though some of them may be unrecognisable to home micro owners.

The most exciting aspect of this advance is that musicians can use computer technology at home to produce results almost indistinguishable from those created in million-pound multi-track facilities. Even inexpensive micros like the Spectrum can be used in applications ranging from MIDI sequencing to patch editing and digital sampling – buzz-phrases which we'll explain as we go along.

Programming music

The simplest way to create music on your micro is to program its internal sound chip in Basic. Apart from the ZX81, practically every home computer has a facility to produce sounds at a range of pitches and tones – all you really need to start creating music.

Music is, after all, merely an arrangement of different sounds over a period of time, and can easily be broken down into the sort of data computers can handle. You won't get results sounding like the performance of a skilled musician unless you're prepared to invest in some fairly expensive kit, but you can build up your investment as your skill and enthusiasm develops.

The Spectrum 48K's music production is limited to sounds produced with a small beeper. This needs to be amplified through a TV using one of the many sound add-ons available to be properly audible.

The Basic format for programming the beeper is *Beep D,P,* where *D* is the duration in seconds and *P* is the pitch expressed numerically. This is obviously very limited, since you cannot play more than one "voice" at once, or alter the tone or envelope shape of the sound.

There are, however, some very clever software packages which use sophisticated machine-code routines to improve the situation. Melbourne House's *Music Box* can be programmed to produce two-part harmonies with percussive sounds, while Cosmic Pop's *Oliver's Music Box* (no relation) also produces clear musical staves.

More sophisticated are the sound chips found in the Amstrad CPC, MSX, Spectrum 128/Plus 2, Atari 520 ST, TI99-4A, BBC and many others. These are all related to the Texas Instruments AY-3-8910 chip, and most feature three voices, "white noise" for percussive effects, and some control over the "envelope" of the sound. Envelope – the speed at which a sound fades in, the level at which it sustains and the rate at which it decays away – is the most useful parameter for simulating instrument sounds.

The Commodore 64/128 has the best sound chip on the home computer market. It features three simultaneous voices, each with a number of waveforms, white noise, four stage envelope control, a sophisticated filter to control the mix of sound frequencies, plus complex effects like harmonic synchronisation and ring modulation. In fact, it has more facilities than many cheap synthesisers, as you'll realise if you've heard some of the more impressive game themes.

The problem with the Commodore 64 is that its Basic has no sound commands at all; you have to program the sound chip using a complex series of POKEs. It's a lot easier on the Commodore 128, where Basic V 7.0 boasts useful commands for pitch, duration, waveshape and so on.

Sound chip software

Whatever computer you have, you will probably soon grow tired of writing programs featuring endless note data arrays to play the simplest tunes. To produce more satisfying music you'll need to invest in some good software. For the BBC, Commodore 64/128 and Amstrad probably the best package is Rainbird's *The Music System,* which uses windows, icons and pull-down menus to produce long, complex compositions which can be printed out. *The Music System* is easy to use for beginners, but there's an Advanced disc-based version available too.

Kuma's *K-Minstrel* and Activision's *Music Studio* do the same job for the ST, while for MSX there's *Odyssey K,* distributed by Rittor. Spectrum 128K/Plus 2 owners should check out the 128K version of Melbourne House's *The Music Box,* and Cosmic Pop's *Music Composer.*

There are a few software-only packages, such as Firebird's *Microrhythm* and Supersoft's *Rhythm King,* which can produce digitally-sampled percussion sounds through the Commodore 64's sound chip. These are excellent value for money, although the sound quality produced is probably not good enough for recording purposes.

The problems of producing music purely with a sound chip are obvious. The sounds themselves are limited, and the notes can only be entered using qwerty keys or a joystick, which limits the expression you can put into the performance. It's also not possible to synchronise the tunes with any other instruments, such as drum machines. This is where you need to consider investing in more hardware.

Music hardware

Music hardware can be divided roughly into five categories; music keyboards, sound add-ons, digital samplers, drum machines and MIDI interfaces.

The simplest keyboard is for the Commodore 64 (there's a version for the 128 too). It's the Music Maker, which clips over the qwerty keyboard, and comes complete with sound synthesising and composing software. Although only two octaves long, it's great fun and the software is well-designed.

More substantial keyboards are available for the BBC, CBM 64 and Spectrum 128. Manufactured by LVL, the Echo keyboard is discontinued now but is still available through dealers such as Dixons. It's a full-size three-octave device, connecting to the computers with a dedicated cable. The software provided gives you preset sounds which can be modified to your own requirements, but it will not record and play back tunes. Certainly easier than playing a qwerty keyboard, but a bit of a dead end.

For other machines, improved keyboards usually come as part of a more sophisticated sound producing system. For the BBC, the Hybrid Technology Music 5000 system turns your computer into a complete digital synthesiser. The voice unit contains all the sound generating circuits, while the operating software, which uses a special language called AMPLE, comes on disc or ROM.

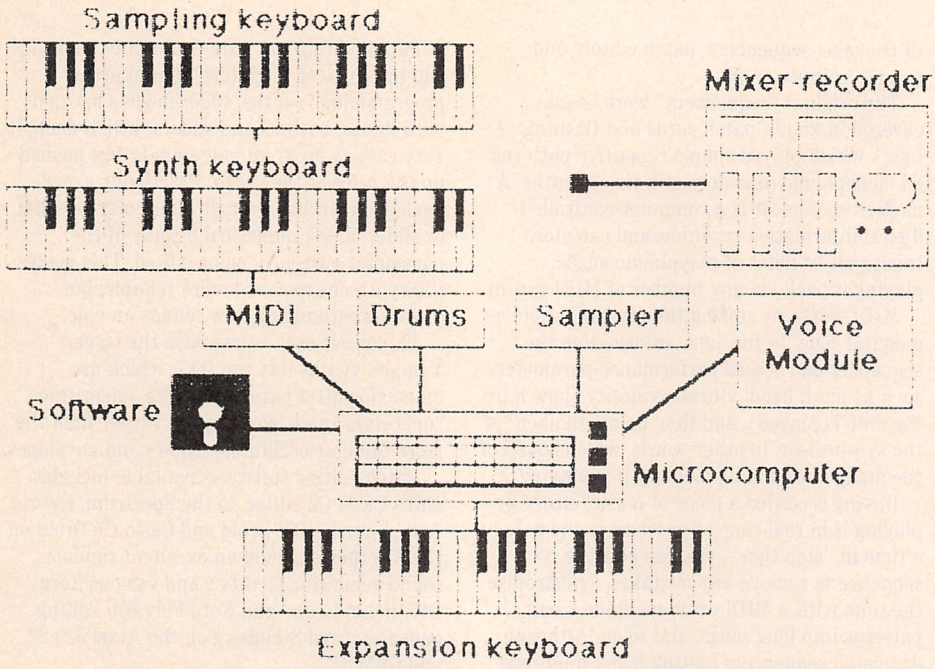
You can define your own sounds, produce very sophisticated compositions, and with the help of the Acorn 400 keyboard, play the synthesiser in real time. The sound quality is comparable to that of the Yamaha or Casio digital synthesisers.

For the Commodore 64, the FM Voice Module opens up the world of real synthesiser sounds. Containing digital sound chips licensed from Yamaha, the Voice Module comes with "home keyboard" software allowing you to produce a wide range of polyphonic synth sounds, autochords, rhythms and arpeggios.

For the more advanced user there's sound editing and composition software available, and although the Voice Module can be used with the miniature Music Maker keyboard, it's best used with the full-size five-octave device, with which it is available in a package.

MSX, of course, is an oddity, since the Yamaha CX5M, which is in most respects a standard MSX machine, is in fact sold purely as a music computer. It comes complete with a digital synthesiser unit comparable to the smaller Yamaha synthesisers, and either a miniature or a full-sized keyboard. There's a good deal of composition and synthesis software available on cartridge, and for many users interested in computer music, a CX5M (or the new CX5M128) would fill the bill nicely.

Another keyboard product which breaks a few barriers is Cheetah's MK5. It's a full-sized, five-octave device, which can be used with an optional interface to play the sound chip of the Spectrum 128. Software for sound editing is included, although there's no facility to store compositions. However, this is just the start of the MK5's abilities. It is in fact a MIDI transmitting keyboard, and so can play any



The complete computer music system.

MIDI-equipped synthesiser, send patch changes and bend notes with the pitch wheel. We'll go into more depth on MIDI in the last section.

Sound sampling

First we'll look at sound sampling and digital drum machines, which work on a similar principle. In the last few years the single largest impact on the world of professional music has been caused by digital sound sampling computers, like the £30,000 Fairlight and the £8,000 Emulator. Although sampling keyboards are now coming down to the more affordable £2,000 region, it's even possible to create sampling effects on the least expensive home computers.

Sound sampling is a process by which the computer "listens" to a real sound through a microphone, and stores its distinctive frequency pattern in the form of bits and bytes. Reversing the process, and turning the digital information back into sound through a digital-to-analogue converter, enables you to replay the sound from the computer.

Obviously, this process uses up lots of memory space, and the higher the quality of the sample the more memory required. The fun starts when, rather than just reproducing the sample as it was recorded, you replay it at a different "clock rate", thus changing the pitch. In this way you can play tunes using any recordable sounds.

Other effects such as reversing, looping and editing the sound allow you to produce surreal effects which are put to great use on the majority of modern pop records, the classic example being Paul Hardcastle's *N-N-N-N-Nineteen.*

Samplers available for the Spectrum include the Cheetah *Digital Sound Sampler,* which includes a good editing facility and a special effects option; and the RAM Music Machine, which also includes a MIDI interface. For the Commodore 64 there's the Music Sales *Sound Sampler,* which with optional software can also be used as a digital drum machine; and the incredibly good Supersoft *Microvox Digital Sound Editor.* This impressive device has MIDI, excellent sampling quality, multi-sampling facility to store many sounds at a time, great visual sample editing, and a host of advanced features which are reflected in its relatively high price.

For the Atari ST there's the ADAP *Sound Rack,* a professional standard sampler giving compact disc-quality and many advanced facilities, at around the £2,000 mark.

Digital drums

Another development of sound sampling is the digital drum machine. First introduced in the form of the LinnDrum from the USA, these machines are now found in practically every recording studio, in the form of the Linn, Sequential Circuits, Drumulator, and the later Roland, Korg and Casio machines. Although some of these will create their own sound samples, most use sounds "blown" permanently onto a chip.

For the Spectrum and Amstrad, you can create the same realistic drum effects with Cheetah's SpecDrum and AmDrum, providing eight drum sounds which can be arranged into complex patterns and songs. New sound sets such as Latin, electro and African are available on tape, and with a little careful addition of reverb or echo in the recording process, some incredible sounds can be produced. These units are compulsory purchases for any computer musician.

Also available is the PolyDrums software package which works with the Commodore 64 Music Sales Sound Sampler, and the Syntron Digidrum for the 64, which has the advantage of operating with disc software. Sounds can be loaded either as sets or individually, edited and arranged into complex songs. Although the main disadvantage with computer-based digital drum machines is that they only have one sound output (rather than one for each sound, as is usual on professional devices), using a good one can give real polish to your recordings.

MIDI theory

Now on to MIDI, which has given rise to almost as many buzz-words as home computing itself: assignment channel, voice number, poly mode, MIDI drone, and so forth. In fact it's all quite easy to understand, since MIDI is nothing more than a musical equivalent of a computer communication standard such as RS-232.

In the bad old days, synthesiser manufacturers all designed their instruments to different standards. If you wanted to connect your Sequential Music Zoomer 8000 to your Nippon Harmonics Cosmotron, you needed to know a friendly engineer who could knock up a black box to transform all the necessary levels and voltages. With the development of digital technology, it became practical to design a standard which would allow any synthesiser to connect to any other. The Musical Instrument Digital Interface was born, and although it isn't perfect, MIDI allows you to do things undreamed of a few years ago.

Since MIDI is a digital standard, computers can handle it just as easily as synthesisers. On a simple level, it allows you to connect one synthesiser to another, so that when you play one keyboard the other synth sounds as well, without you having to touch its keyboard. This is fine for doubling up the number of sounds you can play (assuming you can afford two MIDI synths), but add the information

The Yamaha music system built around the XC5M.

processing power of a computer and you have a system which can store your musical performances in digital form, edit them as you wish, then reproduce them perfectly, playing your MIDI synths, drum machines and samplers while you have a cup of coffee and give an interview to adoring pop journalists.

MIDI interfaces

All sorts of synthesisers, samplers, drum machines, effects units, and even guitars are now fitted with MIDI, and so can be controlled from your computer, using the right software and MIDI interface. The Atari 520 ST has a MIDI interface built-in, which is partly why it has become so popular with computer musicians. The Spectrum 128 also has a MIDI OUT facility built into its RS-232 port, although you will need a Cheetah connection cable to link it up to the 5-pin DIN MIDI standard port on any synth. It's possible (though complicated) to play MIDI synths using the Spectrum 128's Basic, although you will probably want to buy a proper interface and software package to get the best from it.

There are two MIDI interfaces available for the Spectrum; the Micon from XRI, which is a well-made unit including IN, OUT, and drum machine synchronisation sockets; and the Cheetah, which has been advertised for some time but which is still not in the shops.

For the Commodore 64, there are interfaces available from Passport (compulsory if you want to use its excellent software, including the score-generating Music Shop, since some of the I/O routines aren't standard), SIEL, Rosetti, and many others. For the Amstrad, BBC, MSX and many others, there are good hardware/software packages available from EMR.

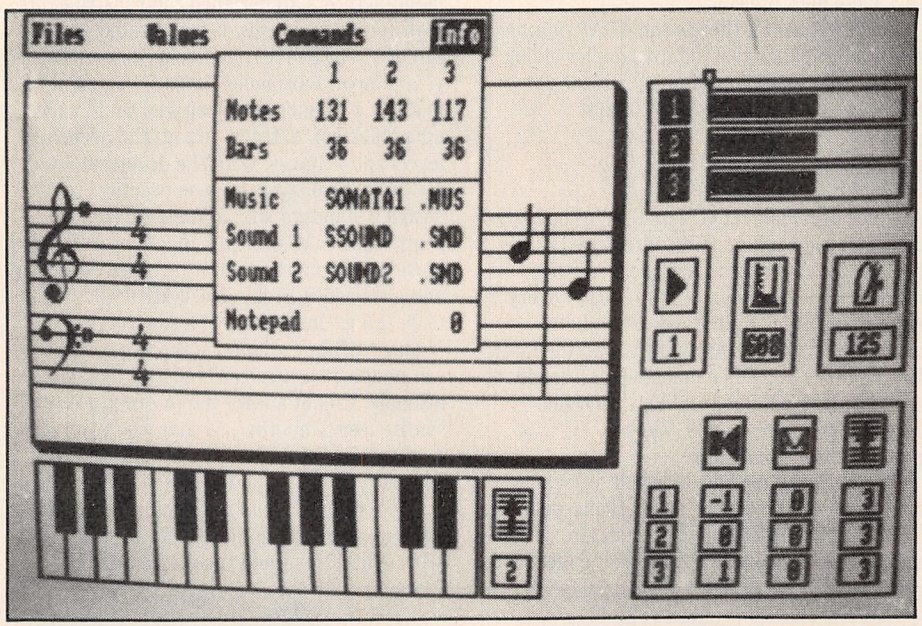
MIDI software

Once you have organised your computer, interface and synthesiser, what software should you choose? There are three main types of package: sequencers, patch editors and sample editors.

The original "sequencers" were boxes covered in knobs, patch cords and flashing lights which played simple repetitive patterns on monophonic (one note at a time) synths. A modern sequencer is a computer-controlled digital information recorder, and can store thousands of notes of polyphonic music, playing it back via any number of MIDI synths.

MIDI works by storing the pitch of a note as a digital code. In the same information the sequencer can record performance parameters such as pitch bend, vibrato, velocity (how hard the note is played), and the "patch number" of the synthesiser; in other words, which sound of the many stored in its memory it is playing.

Having recorded a piece of music, either by playing it in real time or entering it one note at a time in "step time", you can edit the sequence to remove any mistakes, synchronise the tune with a MIDI drum machine, chain patterns into long songs, and so on. Although dedicated sequencers costing many hundreds of pounds, such as the Roland MC-500 and Yamaha QX-1, can do all this, it's often easier and cheaper to use a software package with a home computer, since it can make full use of the monitor display to give you lots of useful information.



Rainbird's The Music System running on an Amstrad CPC.

For the Commodore 64, probably the best sequencer packages are C-Lab and Steinberg's Pro-24. There's also a version of Pro-24 for the Atari, either in hi-res mono or medium-res colour modes, Hybrid Arts' Easy-Track, and several good Passport products.

The choice for Amstrad and MSX is really limited to EMR's packages. Since these computers have little market in the US, where most MIDI software originates, it may be some time before we see any improvement in the situation. For the BBC, in addition to EMR's package there's the excellent UMI-2B and UMI-3B hardware and software combination. For the eight-bit Atari machines, there's an interface and a selection of software from 2-Bit systems.

Patch editing software comes into its own if you have one of the latest "digital access programming" synths. Older models bristled with knobs, buttons and sliders, which made it very easy to program new sounds, but pushed up the price of the synth. Practically every modern synth has a single "incrementor" dial or slider, and a numerical display of the parameter currently being edited. This makes the synth cheaper and more reliable, but makes programming new sounds an epic.

Things get even worse with the larger Yamaha synths like the DX7, which use unusual control parameters like "algorithms", "operators" and "slope rates" rather than the more familiar oscillators, filters and envelopes.

Patch editing software available includes XRI's Casio CZ editor on the Spectrum, Hybrid Arts' Yamaha DX Droid and Casio CZ Droid on the ST (these include an excellent random sound generator facility), and various Korg DW. Roland Juno and Korg Poly 800 editing packages from Steinberg on the Atari 520 ST and CBM 64.

If you are godlike enough to own a sampler keyboard such as the Ensonig Mirage, the Sequential Prophet 2000/2002, or the sublime Akai S900, you can also edit their samples with the right software package. Finding those elusive loop points becomes so much easier with Steinberg's editing software for the ST.

Musical instruments

Buying synthesisers and other musical equipment still involves a hefty investment. However, you can now get excellent synthesisers for under £300, such as the Casio CZ-101, Yamaha DX-100, and the Roland keyboardless preset MIDI module. Drum machines too, such as the Roland TR-505, are becoming increasingly affordable; but the golden rule is to shop around, listen to musicians and make friends with your local music shop!

So, you have your sound generator, your digital drum machine, your MIDI interface, your synths and your inspiration. All you need now is some way to record your masterpieces for posterity. Although it's really outside the scope of a computer magazine to go into great depth on recording equipment, for many people the best option will be a Portastudio-type device plus a good hi-fi cassette machine. Tascam, Vesta, Fostex and many others manufacture four-track recorders with built-in mixers, which allow you to produce very sophisticated recordings with the judicious use of effects such as reverb and echo – also available with MIDI in the case of units like the Alessis MidiVerb and MidiFex.

After that, the sky's the limit – eight- or 16-track recorders and multiple synth units can take you up to the level of professional studios at prices which, while sounding steep for the average home computer user, are tiny fractions of what the same equipment would have cost just a couple of years ago.

The great thing about computer music is that it has no limits; as you gain more skill and become more ambitious, it can be fairly cheap to upgrade your system to produce even better results.

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Basic structures

Control commands are those which enable you to direct the flow of action to wherever you want it. From loops to conditional branches and subroutines, control structures let you impose some sort of order on the shambles that your program would otherwise present.

For . . . Next loops are the most common (last week's example illustrated their use), of control structures and are simply used to make the computer execute whatever program lines are between the *For* and the *Next* a specific number of times. for example:

```
10  For x=1 To 5
20  Print x;: Next x
30  Print "demo"
```

This short program works like this. X is set to 1 in line 10. The computer then executes the *Print* statement in line 20, and then increases x at the *Next* statement.

It now checks to see whether x is greater than the limit set by the *To* statement in line 10, in this case five. If it isn't, it excecutes the statement immediately after the *To.* in this case *Print x;*. After the fifth increase, x will be equal to six and since this is outside the limit, the program continues with the command after the *Next* statement - *Print "demo"*.

It can be seen that *For . . . Next* loops allow you to eliminate time-consuming repetitions. In the above example, avoiding a *For . . . Next* loop will involve something like this:

```
10  Let x = 1
20  Print x;
30  Let x = x + 1
40  If x = 6 Then Goto 60
50  Goto 20
60  Print "demo"
```

In this case, the loop has saved us a few lines, but it is easier to understand what is happening in the first instance than in the second. Consider another case, reading data and stuffing it into an array.

Without using a loop, it might look like this:

```
10  Dim a(8)
20  Let a(1) = 100
30  Let a(2) = 150
40  Let a(3) = 220
50  Let a(4) = 275
60  Let a(5) = 300
70  Let a(6) = 350
80  Let a(7) = 400
90  Let a(8) = 420
```

Using a loop, it can become:

```
10  Dim a(8)
20  For f = 1 to 8
30  Read x
40  Let a(f) = x
50  Next
60  Data 100, 150, 220, 275, 300, 350, 400, 420
```

The second method is much more compact, and if more data was involved it would become progressively more efficient.

Related commands in this field are *While . . . Wend* and *Repeat . . . Until.* Both accomplish the same thing but in a different way. A *For . . . Next* loop always executes a fixed number of times, a *While . . . Wend* may not execute at all since a condition is set at the beginning and the code will only execute if the condition is true. Repeat . . . Until always executes at least once, but the condition is set at the end.

In this second part of our guide to Basic programming, we look at control structures. This group of techniques allows your programs to repeat oft-used sections of code, make decisions, and use sub-routines – small sub-programs that can be incorporated in many different applications.

For example:

```
10  Let x$="Popular"
20  Repeat
30  Input y$
40  Until y$=x$
50  Print "Welcome to the system"
```

In this example, a mock protection system, the user inputs a password and unless it is identical to the real password, line 40 sends the control back round line 20 and subsequently requests the password again.

Branching is a way of sending the program flow in a choice of direction dependent upon the circumstances. To facilitate this feat, the construct *If condition Then action* is used.

If the condition is met (or not - it depends on how you're running things) then a specified action is performed. Some Basics allow the use of the *Else* statement which can be tagged onto the end of the *If . . . Then* line and results in something happening if the condition is not met.

```
10  Let a=1
20  If a=1 Then Let b=10 Else Let b=5
30  Print b
```

Here, the value of B printed would obviously be 10, but if A did not equal 1 (the condition) then the value of B would be 5.

Commands used often with *If . . . Then* are *Goto* and *Gosub* which are themselves part of a group that deal with subroutines.

Believe it or not subroutines are the basis of a subject that can arouse quite amazing reactions for and against. I speak here of structured programming, something hard-nosed advocates will tell you you can't be a real programmer without, and a topic that fans of the Goto statment like to ridicule.

Before we get any further, here is the groundwork necessary to appreciate the argument. Subroutines are blocks of program lines that stand outside the normal flow of a program and can be called from within that program at any point. This allows the same set of lines to be used by many different parts of the program.

There are two commands used to summon the subroutine to do the program's bidding, *Gosub line no.* and *Proc. Gosub* stands for 'go to subroutine' which sends the program to the specified line number. Also the block of lines must end with a *Return* statement otherwise catastrophe won't be far away (the program plods out through the bottom of the routine thinking, "where the hell's the Return statement", and it can run into lines it's not supposed to, with surprising results.

Procedures are only slightly different. The start of the subroutine must be marked with a *Def Proc name* command and finish with *Endproc,* then all that needs to be done to access it is have a program line with *Proc name* in it. The computer goes off and does whatever's in *Proc x* and then returns to the main program. An additional aspect of procedures is the ability to pass variables directly to them from the main program:

```
10  Proc pop(33)
20  Stop
100 Def Proc pop(x)
110 Print x*0.15
120 Endproc
```

This routine will print out 15% of whatever value is used when Proc pop(x) is called. Unfortunately for Spectrum, Commodore and Atari owners your machine does not have procedures. ST owners can use *Gosub name* and label a program line with the name of the subroutine and the program will be directed there.

Spectrum owners can simulate procedures by assigning a value to a variable (such as *Let Comp=2300)* at the beginning of a program and then entering *Gosub Comp* at some later point. The computer will now go to line 2300 in search of a subroutine.

Finally, we come to *Goto.* Love it or hate it, it's undeniably a useful command. *Goto* simply sends the computer to another part of the program listing without recourse to how it's going to return from whence it came.

And so to structured programming, where the program has to be split into independently executable subroutines. The structured advocate complains that the indiscriminate use of *Goto's* leads to a programming style known as spaghetti programming, where it is very difficult to follow the flow of the program and so make changes or track down errors.

On the other hand well-structured programs are prone to be inefficient in comparison, and when memory is at a premium this is not always acceptable.

Personally, my advice (for what it's worth), would be to tread the middle ground, keeping your programs nicely structured but using the odd *Goto* where needs be. The idea is to write programs that work.

MCopy

Seb Tomasim

This extension to Basic will perform the mundane task of copying all the files from one cartridge to another. It will not ask for filenames to copy, nor the amount of files as this is all calculated.

All that has to be entered is the source microdrive number after the command *MCopy*.

This will be taken as the source, the other drive as the destination and copying then proceeds painlessly.

```
32390 DEFine PROCedure MCOPY (Source$)
32400 REMark Takes form: MCOPY '1'
32410 IF Source$=='1' THEN Source$='mdv1_':dest$='mdv2_':ELSE LET Source$='mdv2_':dest$='mdv1_'
32420 CLS:CLS #0
32430 PRINT #0;"Insert both M'drives and press a key"
32440 PAUSE
32450 PRINT 'Format Destination Drive ? (y/n); ';:a$=INKEY$(-1):PRINT a$:IF a$=='N' THEN GO TO 32460
32452 INPUT #0;'Name of Cartridge to be formatted ?'\name$:CLS #0:CLS
32455 PRINT 'Formatting ';dest$&name$:INK 6:FORMAT dest$&name$
32460 INK 7:CLS #0:PRINT 'Copying the whole of ';Source$;' to ';dest$
32470 DELETE mdv2_temp:OPEN_NEW #3,mdv2_temp
32480 DIR #3,Source$
32490 CLOSE #3
32500 OPEN_IN #3,mdv2_temp
32510 Count=0
32520 INPUT #3,dis$,dis1$
32530 REPeat Cloop
32540 Count=Count+1
32550 INPUT #3,fil$
32560 IF EOF(#3) THEN EXIT Cloop
32570 END REPeat Cloop
32580 CLOSE #3
32590 PRINT 'There are ';Count;' files on the source.'
32600 OPEN_IN #3,mdv2_temp
32610 INPUT #3,dis$,dis1$
32620 Count=0
32630 REPeat Loop
32640 INPUT #3,cop$
32650 Count=Count+1
32660 AT 4,0:PRINT 'Copying file ';Count
32670 COPY Source$&cop$ TO dest$&cop$
32680 IF EOF(#3) THEN EXIT Loop
32690 END REPeat Loop
32700 CLS #0
32710 CLOSE #3:DELETE mdv2_temp
32720 END DEFine MCOPY
```


Disc Extra

Paul Lambert

Running out of room on your word processor disc? Want to squeeze the most out of your floppies? Yes? Then this program for the Atari ST is for you.

It allows you to format a disc to 10 sectors which gives you 40 kbytes extra per disc.

The disc after formatting now has 398336 bytes available to the user.

If you do not own an assembler I would be happy to copy the program listing onto a disc for the price of £3.50 or £1.50 plus a formatted blank disc. Make cheques/postal orders payable to Paul Lambert, 25 Braemar House, Maida Vale, London W9 1UT.

```
start:
        move.l  #text,-(sp)
        move.w  #$09,-(sp)
        trap    #1
        addq.l  #6,sp
        move.w  #$1,-(sp)
        trap    #1
        addq.l  #2,sp
        move.w  #79,d5
loop    move.w  #$e5e5,-(sp)
        move.l  #$87654321,-(sp)
        move.w  #1,-(sp)
        move.w  #0,-(sp)
        move.w  d5,-(sp)
        move.w  #10,-(sp)
        move.w  #0,-(sp)
        clr.l   -(sp)
        move.l  #buffer,-(sp)
        move.w  #10,-(sp)
        trap    #14
        add.l   #26,sp
        sub.w   #1,d5
        cmp.w   #3,d5
        bne     loop
        move    #4,d5
loop2   move.w  #$0000,-(sp)
        move.l  #$87654321,-(sp)
        move.w  #1,-(sp)
        move.w  #0,-(sp)
        move.w  d5,-(sp)
        move.w  #10,-(sp)
        move.w  #0,-(sp)
        clr.l   -(sp)
        move.l  #buffer,-(sp)
        move.w  #10,-(sp)
        trap    #14
        add.l   #26,sp
        dbra    d5,loop2
```

Programming: Atari ST

```
                move.w #0,-(sp)
                move.w #2,-(sp)
                move.l #$01000000,-(sp)
                move.l #buffer2,-(sp)
                move.w #18,-(sp)
                trap #14
                add.l #14,sp
                move.b #$20,buffer2+19
                move.b #$03,buffer2+20
                move.b #$00,buffer2+25
                move.b #$0a,buffer2+24
                move.w #1,-(sp)
                move.w #0,-(sp)
                move.w #0,-(sp)
                move.w #1,-(sp)
                move.w #0,-(sp)
                clr.l -(sp)
                move.l #buffer2,-(sp)
                move.w #9,-(sp)
                trap #14
                add.l #20,sp
                move.l #text2,-(sp)
                move.w #$09,-(sp)
                trap #1
                addq.l #6,sp
                move.w #$1,-(sp)
                trap #1
                addq.l #2,sp
                clr.l -(sp)
                trap #1
buffer2 ds.b 512
buffer ds.b $3000
text    dc.b " written by Paul Lambert",$0d,$0a
        dc.b " insert blank disk and press a key",$0d,0
text2   dc.b " 398336 bytes available",$0d,$0a
        dc.b " press any key......",0
```

Programming: BBC

Interrupt Clock

Jonathan Temple

This program provides an interrupt driven clock routine for the BBC and Electron micros.

After debugging, the program, when run, will prompt you for the relevant time details.

Once entered the time will then be displayed in the top left hand corner of the screen in any mode and will be updated every three seconds.

The machine code, located at *&A00,* will even work while some commercial software, such as *Wordwise Plus,* is running.

```
 10 REM Clock
 20 REM Jonathan Temple
 30 REM BBC B/B+/M/E
 40 :
 50 base=&A00
 60 *FX 13,5
 70 PROCassemble
 80 PROCsettime
 90 CALL enable
100 END
110 :
120 DEFPROCassemble
130 eventv=&220
140 oswrch=&FFEE
150 osword=&FFF1
160 osbyte=&FFF4
170 FOR opt=0 TO 2 STEP 2
180 P%=base
190 [OPT opt
220 .enable
230 LDA #clock MOD 256
240 STA eventv
250 LDA #clock DIV 256
260 STA eventv+1
265 JSR settimer
270 LDA #14
280 LDX #5
290 JMP osbyte
300 \
310 .clock
320 CMP #5
330 BEQ timerzero
340 RTS
350 \
360 .timerzero
370 SED
380 INC secflag
390 LDA secflag
400 CMP #20
410 BNE display
420 LDA #0
430 STA secflag
440 LDA minutes
450 CLC
460 ADC #1
470 CMP #&60
480 BNE setmin
490 LDA hour
500 CLC
510 ADC #1
520 CMP #&13
530 BNE sethour
540 LDA #1
550 .sethour
560 STA hour
570 LDA #0
580 .setmin
590 STA minutes
600 .display
610 CLD
620 LDA #218
630 LDX #0
640 LDY #255
650 JSR osbyte
660 TXA
670 BNE settimer
680 LDA #117
690 JSR osbyte
700 TXA
710 AND #64
720 BNE settimer
730 TXA
```

```
740 AND #32
750 STA tabflag
760 LDA #3
770 LDX #4
780 JSR osbyte
790 LDA #134
800 JSR osbyte
810 STX oldx
820 STY oldy
830 LDA #4
840 JSR oswrch
850 LDA #30
860 JSR oswrch
870 LDX #5
880 .printstring
890 LDA string,X
900 JSR oswrch
910 DEX
920 BPL printstring
930 LDA hour
940 JSR displaybcd
950 LDA #ASC(":")
960 JSR oswrch
970 LDA minutes
980 JSR displaybcd
990 LDA #ASC("]")
1000 JSR oswrch
1010 LDA #31
1020 JSR oswrch
1030 LDA oldx
1040 JSR oswrch
1050 LDA oldy
1060 JSR oswrch
1070 LDA tabflag
1080 BEQ tab
1090 LDA #5
1100 JSR oswrch
1110 .tab
1120 LDA #3
1130 INX
1140 JSR osbyte
1150 .settimer
1160 LDA #4
1170 LDX #timeblock MOD 256
1180 LDY #timeblock DIV 256
1190 JMP osword
1200 \
1210 .displaybcd
1220 PHA
1230 LSR A
1240 LSR A
1250 LSR A
1260 LSR A
1270 JSR digit
1280 PLA
1290 AND #15
1300 .digit
1310 ORA #48
1320 JMP oswrch
1330 \
1340 .oldx      BRK
1350 .oldy      BRK
1360 .tabflag   BRK
1370 .secflag   BRK
1380 .hour      BRK
1390 .minutes   BRK
1400 .timeblock
1410 ]
1420 string=timeblock+5
1430 NEXT
1440 $string=" EMITE"
1450 ?timeblock=&D3
1460 timeblock!1=&FFFFFFFE
1470 total%=0
1480 FOR check%=base TO timeblock+4
1490 total%=total%+?check%
1500 NEXT
1510 IF total%<>&70D2 CLS:PRINT''"Check sum error"''"Please check through PROCassemble":VDU 7:END
1520 ENDPROC
1530 :
1540 DEFPROCsettime
1550 $&700="K.10 CA.&"+STR$~base+"|M"
1560 X%=0:Y%=&7:CALL &FFF7
1570 CLS:PRINT ''"Clock installed"
1580 PRINT '"Now set it to hour and next minute:-"
1590 REPEAT
1600 INPUT ''"Hour ",inputhour
1610 UNTILinputhour>0 AND inputhour<13
1620 REPEAT
1630 INPUT  '"Minutes ",inputmin
1640 UNTIL inputmin>=0 AND inputmin<60
1650 PRINT ''"Press <SPACE> when time is"''"exactly ";inputhour;":";inputmin;" and the clock will"
1660 PRINT"start after a short delay."
1670 *FX 21,0
1680 REPEAT UNTIL INKEY-99
1690 ?hour=EVAL("&"+STR$(inputhour))
1700 ?minutes=EVAL("&"+STR$(inputmin))
1710 ?secflag=0
1720 ENDPROC
```


Popular Superbowl

Duncan Evans

You've read the reviews, seen the feature, now you can eat the game. The basic idea is to move the ball ten yards up the field in four attempts (downs) or less. The selection of offensive or defensive plays is menu driven, just press a key and watch the action.

Six points are awarded for a touchdown (getting a man into the opponents' end zone with the ball) with an extra point for the conversion kick.

A field goal is worth three points but you must be within 45 yards in order to make the attempt.

This listing will be run over three weeks so watch this space for more details.

If you can't wait, or you have no fingers, then send £2.00 to D Evans, 19 Veronica Road, London SW17 8QL for a copy.

```
  5 REM Variables
 10 LET jsc=0: LET gain=0: LET mtime=14: LET stime=60
 20 LET quart=1: LET win=0
 30 LET yscore=0: LET cscore=0: LET ytout=3: LET ctout=3
 40 RANDOMIZE 0: LET down=1: LET ytgo=10
 50 LET mess=9900: LET get=9950: LET pblank=9850
 55 LET graph=9300: LET rblank=9800: LET ballon=9700
 95 REM Set screen & enter stats
100 PAPER 1: INK 0: CLS
110 DIM a$(10,12): RESTORE : FOR f=1 TO 10: READ a$(f): NEXT f
115 FOR f=0 TO 55: READ a: POKE USR CHR$ 144+f,a: NEXT f
120 LET m=1: LET m$="": GO SUB mess
130 BORDER 1: GO SUB pblank: FOR f=15 TO 20: PRINT AT f,0; PAPER 5;"       ";AT f,25;"       ": NEXT f
135 PRINT AT 15,25; PAPER 5; INVERSE 1; "BALL ON";AT 17,25;" TO GO ";AT 19,25;" DOWN  "
140 LET ypass=40+INT (RND*51)
150 LET yqbr=10+INT (RND*71)
170 LET yrun=10+INT (RND*81)
180 LET yspt=30+INT (RND*66)
190 LET yblit=10+INT (RND*61)
200 LET yblok=10+INT (RND*81)
210 LET yint=10+INT (RND*81)
220 LET ybk=5+INT (RND*36)
240 REM computers stats
250 LET cpass=40+INT (RND*51)
260 LET cqbr=10+INT (RND*71)
280 LET crun=10+INT (RND*81)
290 LET cspt=30+INT (RND*66)
300 LET cblit=10+INT (RND*61)
310 LET cblok=10+INT (RND*81)
320 LET cint=10+INT (RND*81)
330 LET cbk=5+INT (RND*36)
350 LET m=2: LET m$="Enter your team (max 7 chars)": GO SUB mess
360 INPUT y$: IF LEN y$>7 THEN  GO TO 360
370 LET m=1: LET m$="Enter opposing team (7 chars)": GO SUB mess
380 INPUT c$: IF LEN c$>7 THEN  GO TO 380
390 PAPER 5: PRINT AT 15,0; INVERSE 1;"      ";AT 15,0;y$;AT 17,0; INVERSE 1;"      ";AT 17,0;c$;AT 19,0;" TIME  ": PAPER 7
```

```
 400 LET m=1: LET m$="Here are your team
s ratings": GO SUB mess: LET m=2: LET m$
="Press any key for Defense plays": GO S
UB mess
 410 BRIGHT 1: PRINT AT 16,8;"QB  Run ";
yqbr;"%"
 420 PRINT AT 17,8;"Rushing ";yrun;"%"
 430 PRINT AT 18,8;"Passing ";ypass;"%"
 440 PRINT AT 19,8;"Kicking ";yspt;"%"
 450 GO SUB get: GO SUB pblank
 460 LET m=1: LET m$="Press any key to e
xamine": GO SUB mess: LET m=2: LET m$=c$
+" capabilities": GO SUB mess
 470 BRIGHT 1: PRINT AT 16,8;"Blitz QB
 ";yblit;"%"
 480 PRINT AT 17,8;"Stop  Rush ";yblok;"
%"
 490 PRINT AT 18,8;"Stop  Pass ";yint;"%
"
 500 PRINT AT 19,8;"Block Kick ";ybk;"%"
 510 GO SUB get: GO SUB pblank
 520 LET m=1: LET m$="Press any key to e
xamine": GO SUB mess: LET m=2: LET m$=c$
+" Defense plays": GO SUB mess
 530 BRIGHT 1: PRINT AT 16,8;"QB  Run ";
cqbr;"%"
 540 PRINT AT 17,8;"Rushing ";crun;"%"
 550 PRINT AT 18,8;"Passing ";cpass;"%"
 560 PRINT AT 19,8;"Kicking ";cspt;"%"
 570 GO SUB get: GO SUB pblank
 580 LET m=1: LET m$="Press any key to c
ontinue": GO SUB mess
 590 BRIGHT 1: PRINT AT 16,8;"Blitz QB
 ";cblit;"%"
 600 PRINT AT 17,8;"Stop  Rush ";cblok;"
%"
 610 PRINT AT 18,8;"Stop  Pass ";cint;"%
"
 620 PRINT AT 19,8;"Block Kick ";cbk;"%"
 630 GO SUB get: GO SUB pblank
1000 REM Matchday
1010 IF RND*101<51 THEN  GO TO 1045
1015 LET ko=1
1020 LET pos=0: LET ball=INT (RND*50+1):
 GO SUB ballon
1030 LET m=1: LET m$="Kick off by "+c$+"
 to your "+STR$ (ball): GO SUB mess: LET
 m=2: LET m$="yard line. Select Offense
play": GO SUB mess
1040 FOR f=1 TO 200: NEXT f: GO TO 4000
1045 LET ko=0
1050 LET pos=1: LET ball=INT (RND*50+1+5
0): GO SUB ballon
1060 LET m=1: LET m$="Kick off by "+y$+"
 to their "+STR$ (100-ball): GO SUB mess
: LET m=2: LET m$="yard line. Prepare to
 defend": GO SUB mess
1070 FOR f=1 TO 200: NEXT f: GO SUB pbla
nk
1100 REM Computer Offense
1105 LET win=0
1110 GO SUB pblank: LET m=1: LET m$="Sel
ect Defensive play": GO SUB mess
1120 IF ((down=1 OR down=2) AND RND*100>
15 AND (ball<20 OR ball>80)) OR (down=1
AND RND*100>40) THEN  LET oplay=2: GO TO
 2000
1130 IF (down=1 OR down=2) AND RND*100>3
5 THEN  LET oplay=3: GO TO 2000
1140 IF down=1 OR down=2 THEN  LET oplay
=1: GO TO 2000
1150 IF down=3 AND ytgo<5 AND RND*100>30
 THEN  LET oplay=2: GO TO 2000
1160 IF down=3 AND ytgo<4 AND RND*100>50
 THEN  LET oplay=1: GO TO 2000
1170 IF down=3 AND RND*100>20 THEN  LET
oplay=3: GO TO 2000
1180 IF down=3 THEN  LET oplay=2: GO TO
2000
1190 IF ytgo<4 AND RND*100>33 THEN  LET
oplay=2: GO TO 2000
1200 IF ball>45 AND ytgo<12 AND RND*100>
15 THEN  LET oplay=4: GO TO 2000
1210 IF ball>45 THEN  LET oplay=3: GO TO
 2000
1220 IF ball<46 AND RND*100>20 THEN  LET
 oplay=5: GO TO 2000
1230 LET oplay=3
2000 REM Player defense
2010 BRIGHT 1: PRINT AT 15,8;"1 Blitz QB
";AT 16,8;"2 Stop Rush";AT 17,8;"3 Preve
nt Pass"
2020 PRINT AT 18,8;"4 Block Kick";AT 19,
8;"5 Cover Punt"
2030 BRIGHT 0: IF oplay=4 OR oplay=5 THE
N  PAUSE 50: LET m=1: LET m$="Offense us
ing special team !": GO SUB mess: LET m=
2: LET m$="Choose either 4 or 5": GO SUB
 mess
2040 LET dplay=(CODE INKEY$)-48: IF dpla
y<1 OR dplay>5 OR (oplay>3 AND dplay<4)
THEN  GO TO 2040
2050 GO SUB 5000
2060 IF dplay=1 THEN  LET cplay=yblit
2070 IF dplay=2 THEN  LET cplay=yblok
2080 IF dplay=3 THEN  LET cplay=yint
2090 IF dplay=4 THEN  LET cplay=ybk
2100 IF dplay=5 THEN  LET cplay=25
3000 REM Computer offense v Player defen
se calculations
3010 IF oplay=1 THEN  LET dummy=cqbr
3020 IF oplay=2 THEN  LET dummy=crun
3030 IF oplay=3 THEN  LET dummy=cpass
3040 IF oplay=4 OR oplay=5 THEN  LET dum
my=cspt
3060 GO TO 6090: REM goes to resukts com
putation module
4000 REM Player Offense
4005 LET win=0
4010 LET m=1: LET m$="Select Offensive p
lay": GO SUB mess
4020 GO SUB pblank
4030 BRIGHT 1: PRINT AT 15,8;"1 QB Sneak
";AT 16,8;"2 Rush"
4040 PRINT AT 17,8;"3 Pass";AT 18,8;"4 P
unt";AT 19,8;"5 Field goal"
4050 LET oplay=(CODE INKEY$)-48: IF opla
y<1 OR oplay>5 THEN  GO TO 4050
4060 IF oplay=5 AND ball<55 THEN  BEEP .
2,10: GO TO 4050
4100 REM Computer defense
```

We want your programs!!

Yes, this is your chance to get rich and famous. Well, famous anyway, as *Popular Computing Weekly* is looking for contributions to the Programming pages.

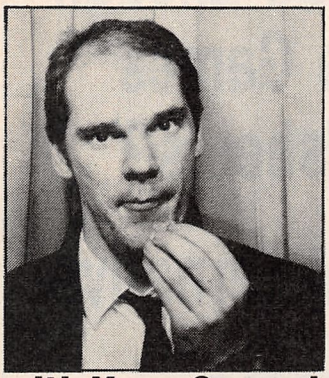
What sort of thing are we looking for? You name it – anything original from games to utilities, applications and the like, written in Basic, machine code or anything else you can think of.

Programs for any computer will be considered, not just the old faithfuls (Spectrum, Amstrad, QL, Commodore, etc), so send those listings in. What we need is a working copy of the program on tape or disc, plus an accompanying article or documentation that you would anticipate going with the piece, normally not over 2000 words.

Alternatively, send in your short programs to the Bytes and Pieces page – what could be easier?

In return, we'll pay the princely sum of £25/page for the main programming pages and £10 for each Bytes & Pieces contribution we publish. Plus the fact that your name will be indelibly carved in the *Popular* Programming Hall of Fame till time immemorial. What more could any true programmer ask?

Just send your masterpieces in to **Duncan Evans, Technical Editor, Popular Computing Weekly, 12–13 Little Newport St, London WC2 7PP** and he'll assess them post haste.



with Kenn Garroch

Mouse building

M Hudson of Leeds, writes:

Q The idea of using a mouse as an input device for computers has gained popularity over the last couple of years. What I would like to do is make one of my own, but I am not sure how they work. I have a BBC micro, so interfacing to the user port should not be a problem. Could you explain how mice work and would it be possible to build one, or is it cheaper to buy one such as the AMX system?

A One method of mouse operation is shown in Figs 1 and 2 below. The first shows how the ball connects to the slotted discs allowing them to detect vertical (forward) and horizontal (sideways) movement. The connection between the ball and the rollers is pure friction allowing the ball to move in any direction.

The motion is picked up via two slotted discs with light emitters (probably light emitting diodes) shining through the slots to be picked up by detectors opposite them.

There are two emitter detectors per wheel with the distance between them less than the distance between the slots. Fig 2 shows how the direction of movement is sensed. When moving right, the left detector goes on first followed by the right detector. The opposite happens when moving left.

As far as the electronics go, you would probably need to square up the pulses from the detectors and then feed them into the user port. By detecting the order the detectors go on and off and counting the number of times they do so, the direction and distance moved can be worked out.

Another, less popular, method is to use a flat sheet with a grid marked on it. A pair of light emitters and detectors in the mouse shine on the sheet picking up the light and dark patches and thus sense movement. This method is used in more expensive CAD systems and is a little more accurate.

Actually building a mouse could be quite difficult unless the parts are easily obtainable, and you might be better off buying a complete system.

With these, apart from the mouse itself, you would get some software to drive it, plus some software to work with windows, button, etc.

Figure 1

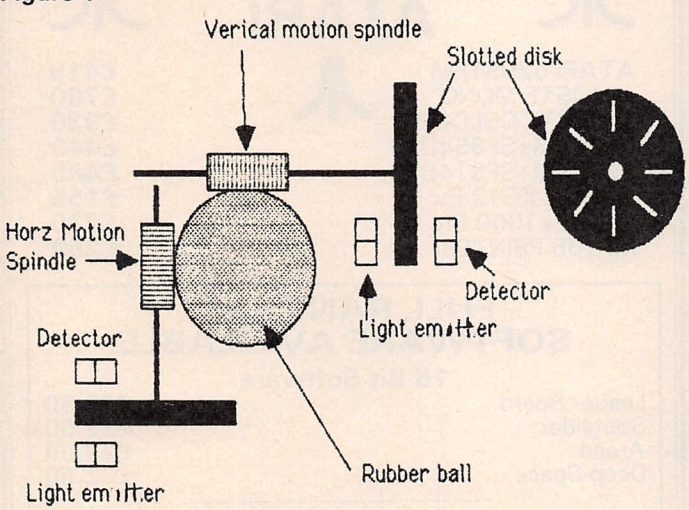
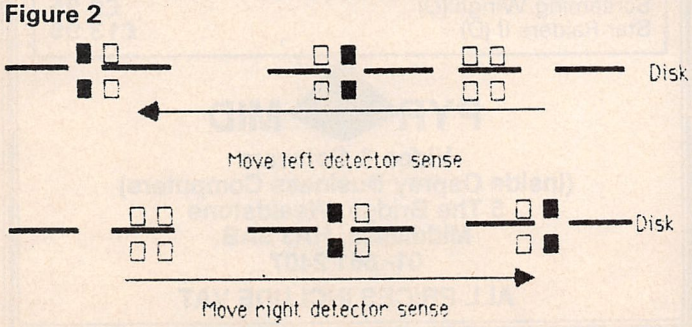


Figure 2



Basic mnemonics explained

An anonymous reader writes:

Q I have a Commodore 64. Could you tell me how I turn code like

```
LDX $ ID
CMP $0210,X
PHP
```

into a Basic loader and could you recommend a good book on machine code for the Commodore 64 for a total beginner?

A The instructions you have sent are machine code mnemonics that are a shorthand way of representing machine code instructions. Each instruction has a different number which, when the microprocessor sees it, performs a different action.

Since microprocessors can only read numbers, but humans find them fairly difficult to remember, mnemonics (easy to remember groups of letters that remind you of what they stand for) are a good compromise.

An assembler program is used to take each instruction and convert it to its appropriate number sequence. For instance:

IDA $ ID means load the X register with contents of memory location (*$ ID* usually means that the number is in hexadecimal or base 16). To convert this to numbers the microprocessor can understand there are two ways: the first, and simplest, is to use an assembler which will scan the text and convert it.

The other method is to do it by hand if you get a book that details the machine code instruction of the microprocessor in question, the 6502 in this case, and look up *LDX.* You'll see that there are a number of possibilities, all of which depend on the numbers that follow the instruction. In this case we have *$ID* which happens to be a zero page address (locations 0 to 255 are zero page). So the number you need is that from the zero page, which happens to be *$A4.* Therefore, *LDX $ID* translates to *$A4 $ID* which the 6502 can readily understand.

If you write a program using the mnemonics, translating or assembling by the manual method can take quite a while for programs other than very short ones.

An assembler is much better, although many of them do not produce Basic loaders as such. They output the program either in a form that can be directly loaded into the appropriate memory location, or in a form that can be interpreted by a loader program and then loaded into memory.

Two reasonable books on the 6502 are *The 6502 User's Manual* by J J Carr published by Prentice Hall and *6502 Assembly Language Programming* by L Levanthal published by Osborne/McGraw Hill.

Alternatively, strictly for the Commodore 64, either *Programming the Commodore 64* by Rae West published by Level Computer Publications, PO Box 438, Hampstead, London NW3, or *The Commodore 64 Programmer's Reference Guide,* published by Commodore/Howard W Sams and Co, are worth getting (the latter being probably the better book).

There are many assemblers and one I can certainly recommend is Supersoft's *Mikro,* which is available on cartridge (Supersoft is at Winchester House, Canning Road, Wealdstone, Harrow, Middlesex).

PDQL *Software for the QL*

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Playing for love and money

Martin Bryant discusses computer chess tournaments

This month I'll take a look at the various aspects of computer chess tournaments. They are very different from the still hush of human tournaments, being more of a frantic battle with often loud verbal discussions of the positions, rapturous cheering and applause at good moves and groans for the bad ones. (Computers don't have their concentration spoiled by noisy outbursts!)

The first full computer chess tournament was held in New York in 1970, when six American programs fought it out for the honour of being the First US Computer Chess Champion. The winner, *Chess 3.0,* was written by a team of three students from Northwestern University, running on a CDC 6400 mainframe, and won all three of its games. Its later versions won the US title for many years after this and also went on to win the world championship (held every three years since 1974) in 1977.

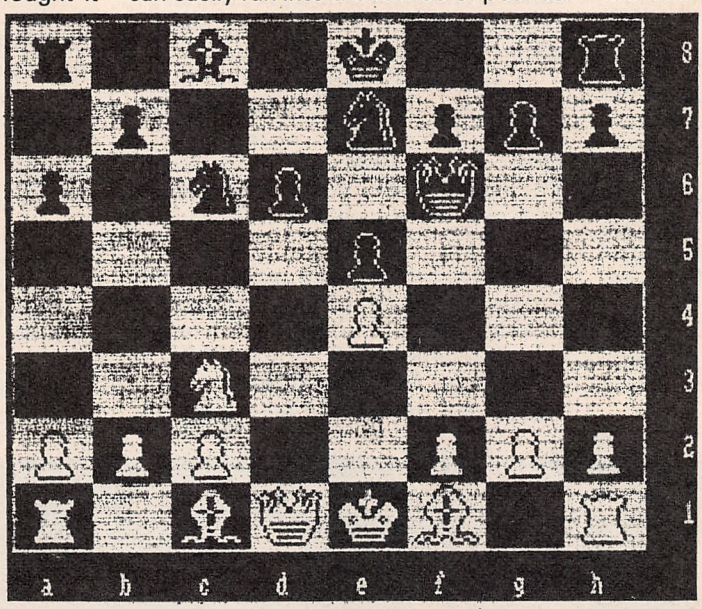
Nowadays tournaments are fairly common, with perhaps as many as 20 entrants competing and several others having to be turned away. The tournaments are usually played using the Swiss system where a limited number of rounds is decided beforehand – the more the better, of course, and programs of roughly equal score matched against each other within each round.

The problems of computer chess tournaments are unique. It isn't just a matter of getting the players to the playing hall on time. For instance, some programs run on vastly expensive mainframe computers and to use these beasts for 'playing games' in the daytime, when thousands of users have 'serious' work to do, can cause severe organisational headaches.

Sometimes terminals and modems are used to connect the mainframes but often these have problems over very long periods (games have been lost due to line failures) so an operator will sit on either end of the phone for the whole game (perhaps eight hours or more).

> *"Nowadays tournaments have as many as 20 entrants, and several others turned away"*

Inter-continental calls aren't cheap, and the phone costs for a tournament can easily run into thousands of pounds. Sponsorship for mainframe tournaments is thus vital to their survival. The mainframe programmers are mostly amateurs, whereas micro-programmers can make a very lucrative living from program sales.



Have you been following *Popular* chess tournament? Turn to page 9 for the latest in Game Two (above)

The games themselves are pretty much the same as for human play with a chess board and a set of chess clocks. Also present, though, are one or more operators for each program and a link to, or 'in person', the computer which is playing the game. The operators must play a completely passive role. They cannot in any way influence the move their program would make.

The operators for each side enter the moves into their program and wait for the reply. Of course, this can sometimes lead to human error in transferring the moves to and from the board. If later in the game an error is detected (by the programs thinking the board position different) then the moves are simply backtracked to the position where the erroneous move was made.

The time limits used for major tournaments are much as for humans, eg, each program must make the first 40 moves in two hours and twenty moves an hour thereafter. Sometimes blitz tournaments are held but then the 'operator-time' (ie, the time it takes to read the computer screen and transfer it to the board and vice versa) becomes significant. It's a bit silly to have the programs playing at five seconds a move, with 20 seconds overhead per move for the operator! The time taken on each move is decided by the program; the operator cannot "interrupt" the program if it has taken long enough on one move.

The early tournaments were generally played in very good humour, but unfortunately, since the influx of micro-based programs, very unsporting moments have occurred. This is because the result of the tournament can mean thousands of extra sales for the winning program.

Some manufacturers enter several versions of their program to increase their chance of winning. Then if their programs are drawn against each other the lower placed program deliberately loses to the higher level one by the operator 'accidentally' setting the program to a very low level before the game starts. This foul play has been combated in some tournaments by not allowing 'cousins' to play each other.

Other times, operators have had very heated arguments over technicalities, with official protests and counter-protests being lodged with the tournament director. It's a pity computers can't all talk to each other and then we could just kick out the humans altogether.

The many faces of Compunet

Graham Edkins brings you up to date on the newest Compunet features and programs

One of the great pleasures of going online to Compunet is that it rarely stands still. The new debate-line area (*Goto Arena*) has now become an established part of the system with many people uploading their views on topics as diverse as the gas share issue, software piracy and video censorship.

Naturally changes can sometimes mean that old areas disappear, although this is not often the case on Compunet as it just keeps on growing but when the Showcase area (*Goto Talent*) was revamped, I did mourn the loss of a few old favourites.

You can imagine my surprise, therefore, when I came across the old Showcase which I had thought had gone. It is no longer accessible from any directory but *Goto Latent* (a play on word talent) will take you straight there.

It is now not the most organised area on the net presumably because Cnet doesn't expect many visitors there but it is a store of some great 'Action' programs.

'Action' programs are ones which will run while you are still online and are suffixed with an *A* in place of the usual *P* for program or *T* for Text. They are undoubtedly useful for anyone who has to try to store their downloads to tape, as this can be a slow process, and they do provide an interesting addition to one's online time.

Page 830 (On-line Action) and 8300 (Hi-Res Action) have page after page of Hi-Res graphics, some of these can take a minute or two to download but the result is always worthwhile. The curious *Goto 'Old-Mus'* now, sadly, holds nothing but a run of empty directories but in *Oldart* you will find an area of downloadable free art, but as this is at the end of about five empty directories, you will find it much faster to jump to them with *Goto 1753*.

The last area in *Latent* is Music Action at 8310, which holds only four action programs but two of them are classics. The first, *Axel F* from Bogg is now part of Bogg Album 1, while the second, *Bev' Hills Cop.* is the same tune but from a different programmer, Ratt.

The coding which brings us Action programs on Compunet was written by the Ariadne team. It has been involved with the system for a mighty long time, right back to 1981, in fact, when it designed Petnet which was a prototype Compunet. It also wrote the Compunet terminal software and the 'Links' to *Mud* and Party Line.

Party Line is, for me, the best available UK chatline, because you type your message on to the same screen that displays the chat. Even the additional connect charge of £1.00 per hour fails to stop me using this line more than any other.

To see Party Line (or for that matter *Mud*) at its very best, you also need the 'special link' which separates your screen into a send area and a receive area and also lets you scroll back and forth over messages that you may have missed.

The 'special links' are again the work of Ariadne and can be used for the night for 50p, or you can download them at a one off charge of £5.75 and £7.99 for Party Line or *Mud* respectively.

Given the role of Ariadne on the system it's not surprising that it has its own directory (*Goto 540*).

The first thing to do is run the Action frame at the top of the page but when you have done that take a look into the Free Utilities (157230). Here you will find *Frabas*, a program that will convert a Compunet frame file into a program file; *Snapshot* will send a basic program screen to the Cnet modem editor or Commodore printer; and finally *Dump*, which will print a basic program frame to a Commodore printer without the modem in place.

The online code is downloaded into your computer when you log-on unless you have a current version in memory. This has just been re-written; the main changes have simply been to correct the odd system quirk left over from previous system enhancements.

With the new code now operating, the display on the left of the directory which reads out life, author, price, vote and date now shows the appropriate information while you are arranging an upload.

The odd symbols which appeared at the base after selecting an area with an alpha goto name have now been replaced by the correct name.

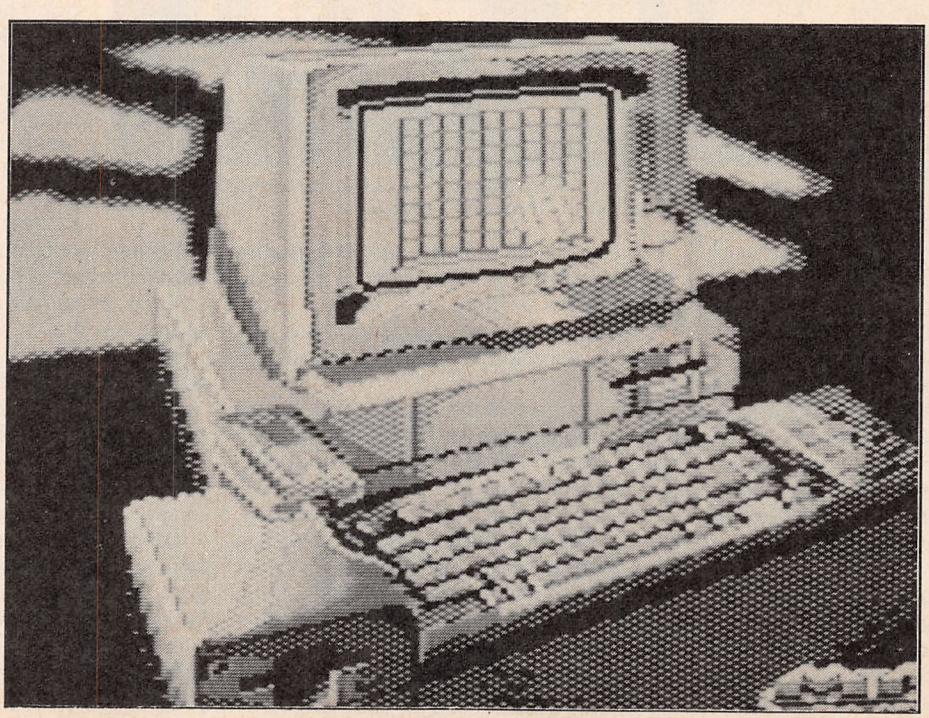
When *Goto* is selected in the duckshot it now responds *Goto?* and not *Goto Number?* as in the past.

To round off, I'll suggest couple of other places to visit. The Jungle MkII (*Goto MarkII*) is full of good free software.

I would especially recommend Shandor's area at 215408 and Kaynot's Danger Zone at 206422.

Many thanks for all your messages, I trust that my replies have been of help.

Anyone wishing to contact me with questions, etc, may do so on Telecom Gold 72: MAG60070, Prestel 213739079 or Cnet GE81.



Next week, more on Bulletin Boards from David Wallin.

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Tracking down the best for the ST

Mark Jenkins continues his review of Atari EZ-Track

Last week, we started to look at the *EZ-Track ST* program from Hybrid Arts, via Syndromic Music, a 20-track polyphonic Midi composer for the Atari T20ST and 1040ST, aimed very much at the Midi beginner.

Basically, *EZ-Track*'s 20 channels remain in Record mode at all times. The metronome symbol moves during playback and recording and the Pause and Stop icons (as if you didn't guess from the huge and non-functional painting of a multitrack tape machine at the bottom of the screen) are pretty self-explanatory.

The tempo can be adjusted from 0·5 to 480 beats per minute in small or large increments using the arrow/shift keys or the mouse buttons, the latter having to be clicked repeatedly which is a bit boring. The Counter icon shows elapsed time in beats and clocks, with 96 clocks per beat and each beat equal to a quarter note. Single Step mode can be achieved by clicking on different parts of the counter icon for single beats, 16ths or even single clocks.

If you switch on the Midi Thru function, any notes played on the connected synth will be combined with *EZ-Track*'s output, and you can choose to convert all such notes to any one Midi channel. It's also possible to transpose a song four octaves up or down using the keyboard icon, which gives transposition values in semitones and you can exempt one track from such transposition (useful if it contains drum data as many instruments are used).

You might have guessed by now that *EZ-Track* has one big limitation; a total lack of advanced editing options. Once you've recorded a track you can either keep it or do it again; you can't alter a couple of notes, nor can you append anything to it or select a section and copy it to form a repeating bass line. You can't even define one section of music to act as a chorus and store it away while you work on a verse, which shouldn't have been too difficult to implement.

However, Hybrid Arts has several more programs on the way for the ST; *MidiTrack ST* has 60 tracks, additional editing functions and a hardware interface for sync to drum machines and tape, while *MidiTrack Professional* has even more editing facilities plus SMPTE time code reading and writing, which is handy for synchronisation to film and video.

> *"EZ-Track ST has its limitations, but at least it's part of an expanding system. At £59.95, it's not outrageously expensive and if you have an ST it should prove an easy 'way in' to the control of midi synths"*

We've looked at Hybrid's *DX-Droid* which edits Yamaha DX synthesisers in a very intelligent way, and will be looking at the Casio version, *SZ-Droid,* shortly. A patch librarian, sampler editors, music scoring software and the 16-bit ADAP sampling hardware are all on their way too, and once you've purchased any Hybrid Arts package you'll receive inexpensive software updates and be given the chance to change up to a more advanced program relatively cheaply.

So *EZ-Track ST* has its limitations, but at least it's part of an expanding system. At £59.95 it's not outrageously expensive and if you have an ST it should prove a very easy 'way in' to the control of Midi synths. *EZ-Track* will be enough to get you hooked, and after that track from such transpositions (useful if it contains drum data rather than notes) by clicking on the adjacent box.

EZ-Track's capacity is approximately 27,000 notes on a 520ST and 63,000 on a 1040ST and the amount of memory used is shown as a percentage. While you're recording or playing back you can mute or solo any track, and the symbols which flash in the Activity column show how many notes are playing on a track at any one time.

Any track can be copied to another without altering the original, either to arrange the tracks in a more logical order or to double parts. This is easily done with the mouse, and it's equally easy to mix tracks together. If you select Time Correct from the edit menu you can correct performances while copying to the nearest $\frac{1}{2}$ note, $\frac{1}{4}$ note, and so on up to $\frac{1}{32}$ triplets, and since the original isn't lost it doesn't matter if you overdo it a little first time.

Various Midi commands to change the mode of connected instruments can be sent on any or all channels (*All Channels Omni On/Poly* is good for emergencies!) and it's also possible to turn on and off the Midi clock output. Features in the Safety section can stop you from halting the song by putting the mouse near the menu boxes; can insert warnings before deleting or replacing data; and can create backup files of existing songs (suffixed SNG) when updating.

EZ-Track can control an external Midi drum machine and can also record the beats from it as part of a song, but it apparently can't be driven from a drum machine. It can, however, control as many Midi synths as you like, whether or not you need to use a Midi Thru box (which could simplify connections and avoid possible Midi delays as you'll probably want to move on to Steinberg's *Pro 24* or Hybrid's own *MidiTrack*.

Next week, a look at two packages from XRI for the Sinclair Spectrum – a database which names and stores patches from almost any synth to tape or microdrive, and a sophisticated editor for the Casio CZ range.

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If you have any queries or tips for this column, please write to Mark Jenkins at *Popular Computing Weekly,* 12–13 Little Newport Street, London WC2H 7PP. Mark would also welcome examples of your own music on audio or program tape, or disc.

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(144)

New Releases

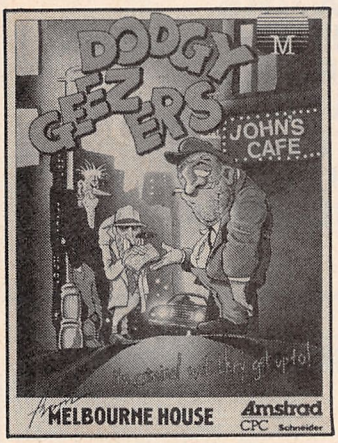
John Cook looks through this week's new arrivals

Amstrad CPC

Program *Hyperbowl* **Type** Arcade **Price** £1.99 **Supplier** Mastertronic, 8–10 Paul Street, London EC2.

Asteroid-type graphics in a interstellar game of penny football. Great stuff.

Program *Dodgy Geezers* **Type** Adventure **Price** £8.95 **Supplier** Melbourne House, 60 High Street, Hampton Wick, Kingston Upon Thames, Surrey KT1 4DB.



More love it or hate it Chas and Dave/*Minder* type humour from the authors of *Hampstead.* Personally . . .

Atari ST

Program *Saved!* **Type** Utility **Price** £29.95 **Supplier** Hisoft, The Old School, Greenfield, Bedford MK45 5DF.

Selection of desktop utilities which include ram disc, print spooler, clock, various disc functions from within Gem and a speed-up disc program.

C16/Plus 4

Program *Panic Penguin* **Type** Arcade **Price** £2.99 **Supplier** Midas Marketing, 35 West Hill, Dartford, Kent DA1 2EL.

The world may well not be ready for another *Pengo* clone – but if you want one for the C16/Plus 4 . . . here it is.

Program *The Way of the Exploding Fist* **Type** Arcade **Price** £6.95 **Supplier** Melbourne House, 60 High Street, Hampton Wick, Kingston Upon Thames, Surrey KT1 4DB.

Commodore 64

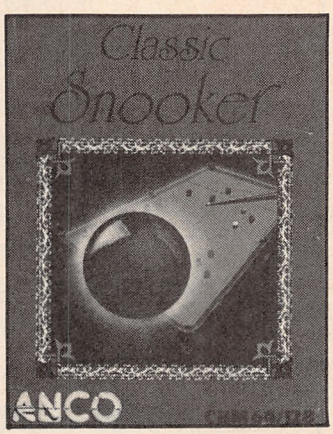
Program *Nosferatu the Vampyre* **Type** Arcade Adventure **Price** £9.95 **Supplier** Piranha, 4 Little Essex Street, London WC2R 3LF.

Neat arcade adventure nicely done in 3-D perspective graphics. Clever logical puzzles should prove a challenge to budding Van Helsings.

Program *Terracognita* **Type** Arcade **Price** £1.99 **Supplier** Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.

Program *Classic Snooker* **Type** Simulation **Price** £5.95 **Supplier** Anco, 35 West Hill, Dartford, Kent DA1 2EL.

Perfectly adequate snooker game launched at a particularly unfortunate time. It'll be worth checking out Code Master's *Snooker* (at £2.99) before you buy this one.



Program *Park Patrol* **Type** Arcade **Price** £1.99 **Supplier** Firebird Software, 64–76 New Oxford Street, London WC1A 1PS.

Pick of the week

System addict

Program *Portal* **Type** Unique Strategy **Micro** Commodore 64 **Price** £24.99 **Supplier** Activision UK, 23 Pond Street, London NW3.

There are occasions when Activision can come up with something really innovative and outstanding. Think of *Little Computer People.* Was there anyone not vain enough to have been completely fascinated by *Alter Ego*? Now there's another to add to the roll of honour – *Portal.* Programmed by the Nexa Corporation, written by Rob Swigart (soon to be hailed as a visionary from the 9th dimension) this game is everything *Hacker* promised to be – but wasn't.

The scenario, introduced by a well-written, atmospheric, six page prologue (Rainbird eat your heart out) is simple. In 2004, you set out on a lone expedition to 61 Cygni on a sub-lightspeed craft.

Something went wrong as time dilation affected the ship's circuits – and you wake from hibernation not at your intended destination, but approaching Earth orbit. It is the year 2106 and the Earth is deserted.

There is one functional terminal of the massive Worldnet functioning – and as you tentatively try to explore the system, you discover clues as to the fate of Mankind.

Then Homer, the AI section of the computer, comes alive. The machine has amnesia, the machine is lonely – and needs your help to find out where the humans have gone.

It's fascinating. Played by accessing text files from a system of icons, it's beautifully designed as you try to figure out what the hell is going on.

In the initial stages, the Worldnet is divided up into 12 subject sections, which you can interrogate. To start with, most are empty, but fill up as time goes on and your activity gradually brings the machine to life.

Who knows what happens after that – there are three discs to plough through, but the thing has such a strange addictiveness, that hopefully I'll be finding out soon.

Out on Commodore disc now, soon on Amiga, ST, PC and Mac, *Portal* is destined to be a classic.

Old Activision US product being sold off at budget in the UK. Arcade silliness as you play the part of a Park Keeper with all the trials and tribulations that go with the job. (Wot? No muggers?) Chunky VCS style graphics make it look a bit dated.

Program *Dragon's Lair II, Escape from Singe's Castle* **Type** Arcade **Price** £9.95 (tape) £13.95 (disc) **Supplier** Software Projects, Bearbrand Complex, Allerton Road, Woolton, Liverpool, Merseyside L25 7SF.

Gambling is a terrible thing. When *Dragon's Lair Part 1* came out, I bet a king's ransom (£10) that it would not reach number one. It did. Which only goes to show. Socrates *is* a fish.

Program *Erebus* **Type** Arcade **Price** £8.95 **Supplier** Virgin Games, 2/4 Vernon Yard, London W11 2DX.

Decent shoot 'em up with a pedigree as long as your arm. Best zapper so far this year.

Program *Police Cadet* **Type** Arcade **Price** £2.99 **Supplier** Midas Marketing, 35 West Hill, Dartford, Kent DA1 2EL.

Another release from Anco's budget label – and it's a goodie. Licensed from Artworx in the States, it's a 'shoot the baddies without taking out the bystanders' job. On the other hand – if you're feeling particularly violent . . .

Program *Shanghai* **Type** Strategy **Price** £9.99 (tape) £14.99 (disc) **Supplier** Activision, 23 Pond Street, Hampstead, London NW3.

MSX

Program *Timetrax* **Type** Arcade **Price** £2.99 **Supplier**

Bug Byte, Argus Press Software, Victory House, Leicester Place, London WC2H 7NB.

Program *Bridge* **Type** Strategy **Price** £12.95 **Supplier** Infogrames, Mitre House, Abbey Road, Enfield, Middx EN1 2RQ.

PC and Compatibles

Program *The Professional's Package* **Type** Application **Price** £99.00 **Supplier** Blyth Software, Mitford House, Benhall, Saxmundham, Suffolk, England TP17 1BR.

Program *The Rental Package* **Type** Application **Price** £99.00 **Supplier** Blyth Software, Mitford House, Benhall, Saxmundham, Suffolk, England TP17 1BR.

Program *The Retailer's Package* **Type** Application **Price** £99.00 **Supplier** Blyth Software, Mitford House, Benhall, Saxmundham, Suffolk, England TP17 1BR.

Program *The Motor Trade Package* **Type** Application **Price** £99.00 **Supplier** Blyth Software, Mitford House, Benhall, Saxmundham, Suffolk, England TP17 1BR.

PCW 8512

Program *SAM* **Type** Utility **Price** £29.95 **Supplier** Pride Utilities, Whitehill House, 6 Union Street, Luton, Beds.

A collection of five utilities you may or may not find a use for. A straightforward directory editor, a fast formatter, a routine to inverse the screen display and a speed-up disc program that claims to improve save-load by 30%. Most interesting, maybe, is the file scrambler that give your files a degree of protection from prying eyes. Thirty quid is a bit steep for this pot pourri, however.

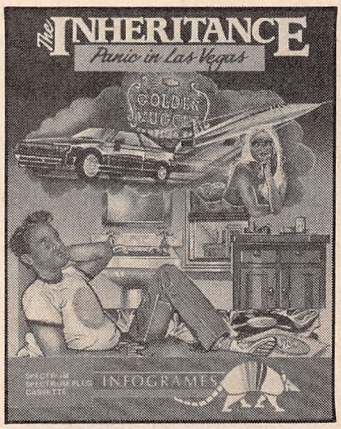
Spectrum

Program *Azimuth Head Alignment Tape* **Type** Self Explanatory **Price** £8.99 **Supplier** Interceptor Micro's, Lindon House, The Green, Tadley, Hampshire.

The advent of the Plus Two could see a revival for the alignment kits – this one has the classic *Wheelin' Wallie* on side two.

Program *The Inheritance (Panic in Las Vegas)* **Type** Icon-driven Adventure **Price** £9.95 **Supplier** Infogrames, Mitre House, Abbey Road, Enfield, Middx EN1 2RQ.

Meaty three parter from those French types at Infogrames UK. An adventure controlled by joystick – the graphics are excellent, the problems are tricky . . . what more do you want?



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Donating to a worthy cause

"Dragon 32 colour computer, immaculate condition, hardly ever used, cost £175 bargain at £99."

How many times have you read adverts like that in the personal computing press and thought to yourself, "who are they trying to kid?".

Who in their right minds would expect anyone to pay nearly £100 for a secondhand defunct computer when for a few pounds more you could buy the latest technological breakthrough.

The answer is of course that we all would. It is very difficult to come to terms with the fact that the machine you saved hard for and spent a small fortune on is now practically worthless.

The trouble with this type of technology is that it changes so quickly that your fully functional innovative computer can suddenly become obsolete overnight.

The seller is obviously out to get as much of a return on their investment as they can and so is unlikely to accept your 'kind' offer of £20 for a machine that is advertised at £99.

So instead of selling old faithful it is put away for future use, never to see the light of day again. There is a whole wealth of computing power hidden away in attics and cupboards simply because it is not worth the effort to try and sell it.

"What has to be realised is that any computer has a value, even if it is not a monetary one . . . they provide an education into the world of technology for many people"

What has to be realised is that any computer has a value, even if it is not a monetary one. Computers are more than just games machines; they provide an education into the world of technology for many people who would otherwise never venture further than the local money dispenser.

The education system has put a micro in every school, but this is just not enough to provide the education of the masses. It gives pupils an introduction into the world of computing and then takes away the cherry at the end of the lesson.

Those with parents rich enough to provide machines at home go away and build on what has been learnt at school, but for the vast majority there is nothing.

The moral of this story is quite simple. If everyone of those unwanted but prized possessions could be passed on to the schools the growth of computer literacy could be further stimulated. I know there will be many a teacher who says that they don't have the time or the knowledge to accommodate 101 different types of computer unless of course they are all BBCs.

But I am not saying that you have to be conversant in every different dialogue of Basic, just that every machine has its value. Surely a room of 20 Dragons is preferable to a room with one solitary BBC.

If only as an introduction, pupils can be let loose on the machines to experiment and investigate and if one goes bang so what, you still have 19 left.

Open up the machines, let the pupils see what is inside. It isn't just a mystical black box to stand on a plinth and admire. People should be encouraged to use the available power of computers and not to be frightened of them.

So come on all you computer buffs, open up those cupboards and donate that prized possession to a worthy cause.

You have had your money's worth, so put it to good use and stop dreaming of that ever illusive £99.

Ian Moffat

NEXT WEEK

Beginners' Guide to Computing

Part three of our series on getting to grips with your computer continues with features on communications, operating systems, and further steps in Basic.

Communications – how to link your computer to public databases and other micros via a modem, and what services are available.

Operating systems – CP/M, a ten year old industry standard, and yet still flourishing in many popular home micros today. Find out how to use CP/M on your computer.

Basic – incorporating graphics in your Basic programs.

Software

***Plan-it* is a suite of utility programs to help you organise your life better from Database Software for the Amstrad CPCs and PCWs.**

Hardware

We try out the MP200 dot matrix printer from Microperipherals. Find out if it would suit you, next week.

TECHNOLOGY SO ADVANCED ...

MEMORY
* 512Kbytes RAM (520ST-M, FM)
* 1024Kbytes RAM (1040ST-F)
* 192Kbytes ROM
* 128Kbytes external plug-in ROM option

ARCHITECTURE
* Motorola 68000 Central Processing Unit (CPU) with a clock speed of 8MHz
* 16-bit external data bus
* 32-bit internal data bus
* 24-bit address bus
* 8×32-bit data & address registers
* 7 levels of interrupts
* 56 instructions
* 14 addressing modes
* 5 data types
* DMA (Direct Memory Access)
* real time clock as standard

GRAPHICS
* full bit-mapped display
* palette of 512 colours

Using Atari Monitors (on 520 & 1040):
* 640×400 high resolution - monochrome
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 80 column text display (40 col low res)

Using Domestic TV (on 520):
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 40 columns × 25 line text display

SOUND AND MUSIC
* 3 programmable sound channels
* frequency programmable 30Hz - 125KHz
* programmable volume
* wave & dynamic envelope shaping
* programmable attack, decay, sustain, release
* Musical Instrument Digital Interface (MIDI)
* MIDI allows connection of synthesisers etc.

MOUSE
* high precision
* 2 button control
* free with 520ST-FM/1040ST-F
* non slip ball motion sensor
* removable ball for easy cleaning

STANDARD SOFTWARE
* GEM desktop + TOS operating system
* ST BASIC interpreter/language system

INPUT/OUTPUT
* MIDI out ..... (5 pin DIN) 31.25K baud
* MIDI in ..... (5 pin DIN) 31.25K baud
* audio out ... 1.0V DC peak to peak, 10K ohm
* audio in ..... 1.0V DC peak to peak, 10K ohm
* RGB monitor ..... 1.0V DC, 75 ohm
* mono monitor ..... 1.0V DC, 75 ohm
* mono horizontal scan rate 35.7KHz
* mono vertical scan rate 71.2KHz
* sync ..... 5V DC (active low) 3.3K ohm
* modem/serial ..... RS232C, 50 to 19,200 baud
* floppy disk ..... 250 Kbits/s
* hard disk ..... 11.3 Mbits/s
* mouse ..... standard Atari connector
* joystick ..... standard Atari connector
* cartridge port ..... 128K capacity
* RF output (520ST-FM) ..... for TV use

OPERATING SYSTEM
* TOS with GEM environment in ROM
* hierarchical file structure with sub-directories and path names
* user interface via GEM, with self explanatory command functions
* multiple windows + icons
* window resizing, re-positioning and erasing
* drop down menus (selected by mouse)
* GEM virtual device interface

COMMUNICATIONS
* RS-232C serial modem port
* 8-bit parallel printer port
* MIDI port (also for networking use)
* VT52 terminal emulation

KEYBOARD
* standard QWERTY typewriter format
* 95 full stroke keys
* 10 function keys
* 18 key numeric keypad + cursor keys
* variable auto-repeat & key click response
* keyboard processor reduces CPU overhead

... IT'S AFFORDABLE

ONLY FROM SILICA

Finally, there's a personal computer that not only solves problems like other computers, but also solves the one problem that other computers have created. Affordability. Silica Shop are pleased to present the ST range of personal/business computers from Atari. The ST was designed utilizing the most recent breakthroughs in semiconductor technology, producing a personal computer that performs tasks with fewer parts. Which means it costs less to make. And less to buy. The latest ST computers now include built in power supplies and built in disk drives. The TOS operating system and GEM window environment are now on ROM chips which are already installed in the ST keyboard. This enables automatic instant booting when you switch on. Silica Shop are pleased to offer the complete Atari ST range. Our mail order department is situated in Sidcup and we have 4 retail outlets at Sidcup, Orpington, Lion House (Tottenham Court Rd) and Selfridges (Oxford Street). We have eight years experience of Atari products, longer than any other UK company, and are well established as the UK's No.1 Atari specialist. With a group turnover of over £5 million and in excess of 70 staff, we provide unbeatable service and support. We provide several facilities which you will find invaluable during your Atari computing life and most of these facilities are available **ONLY FROM SILICA**. We suggest that you read through what we have to offer, before you decide where to purchase your Atari ST.

FREE STARTER KIT - Only From Silica

When you purchase any Atari ST keyboard, you will not only receive the best value for money computer on the market, but you will also receive the following from Atari Corporation as part of the package:
** BASIC Language Disk * BASIC Manual * ST Owners Manual * TOS/GEM on ROM*
If you buy your ST from Silica Shop, you will also receive:
** NEOchrome - colour graphics program * 1st Word - Word Processor*
In addition, we at Silica would like to see you get off to a flying start with your new computer, so we have put together a special **ST STARTER KIT** worth over £100, which we are giving away **FREE OF CHARGE** with every ST computer purchased at our normal retail prices. This kit is available **ONLY FROM SILICA** and is aimed at providing users with a valuable introduction to the world of computing. We are continually upgrading the ST Starter Kit, which contains public domain and other licensed software, as well as books, magazines and accessories all relevant to ST computing. Return the coupon below for full details.

DEDICATED SERVICING - Only From Silica

At Silica Shop, we have a dedicated service department of five full time Atari trained technical staff. This team is totally dedicated to servicing Atari computer products. Their accumulated knowledge, skill and experience makes them second to none in their field. You can be sure that any work carried out by them is of the highest standard. A standard of servicing which we believe you will find **ONLY FROM SILICA**. In addition to providing full servicing facilities for Atari ST computers (both in and out of warranty), our team is also able to offer memory and modulator upgrades to ST computers.

1Mb RAM UPGRADE: Our upgrade on the standard Atari 520ST-M or 520ST-FM keyboard will increase the memory from 512K to a massive 1024K. It has a full 1 year warranty and is available from Silica at an additional retail price of only £86.96 (+VAT = £100).

TV MODULATOR UPGRADE: Silica can upgrade the 1040ST-F to include a TV modulator so that you can then use it with your TV set. This is an internal upgrade and does not involve any untidy external boxes. A cable to connect your ST to any domestic TV is included in the price of the upgrade which is only £49 (inc VAT). The upgrade is also available for early 520ST computers at the same price.

THE FULL STOCK RANGE - Only From Silica

We aim to keep stocks of all Atari related products and our warehouse carries a stock of £½ million. We import many software titles direct from the USA and you will find that we have new releases in advance of many of our competitors. Unlike dealers who may only stock selected titles, we have the full range. In addition, we carry a complete line of all books which have been written about the Atari ST. A range as wide as ours is something you will find is available **ONLY FROM SILICA.**

AFTER SALES SUPPORT - Only From Silica

Rest assured that when you buy your ST from Silica Shop, you will be fully supported. Our free mailings give news of releases and developments. This will help to keep you fully up to date with what's happening in the Atari market. And in addition, our sales staff are at the end of a telephone line to service all of your Atari requirements. If you purchase an ST from Silica and would like any programming or technical advice, we have a full time technical support team to help you get the best from your computer. Because we have both the staff and the systems specifically dedicated to providing after sales service on Atari ST computers, we are confident that our users enjoy an exceptionally high level of support. This can be received **ONLY FROM SILICA**.

FREE CATALOGUES - Only From Silica

At Silica Shop, we recognise that serious users require an in-depth information service, which is why we mail free newsletters and price lists to our ST owners. These are up to 48 pages long and are crammed with technical details as well as special offers and product descriptions. If you have already purchased an ST and would like to have your name added to our mailing list, please complete the coupon & return it to us. The information service is available **ONLY FROM SILICA**.

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Most orders are processed through our computer within 24 hours of receiving them. Most hardware orders are sent by the overnight METRO courier service FREE OF CHARGE to customers within the UK. This method helps to ensure minimum delay and maximum protection.

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We hope that the combination of our low prices, FREE UK delivery service, FREE Starter Kit and FREE after sales support, will be enough to make you buy your Atari equipment from Silica Shop. If however, there is something you wish to purchase, and you find one of our competitors offering it at a lower price, then please contact our sales department, providing us with our competitor's name, address and telephone number. If our competitor has the goods in stock, we will normally match the offer (on a 'same product - same price' basis) and still provide you with our normal free delivery. We realise that we are not the only company who will match a competitor's price. However, if you come to us for a price match, you will also be entitled to our after sales service, including free newsletters and technical support. This makes our price match promise rather special, something you will receive **ONLY FROM SILICA**. We don't want you to go anywhere else for your Atari products. So shop at Silica, the UK's No1 Atari Specialist.

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520ST-M

The affordability of Atari computers is reflected in the price of the 520ST-M keyboard, which is a mere £259 (inc VAT). This version of the ST comes with 512K RAM, as well as a modulator and lead for direct connection to any domestic TV. The price does not include a mouse. In addition, when you buy your 520ST-M from Silica, you will also receive the FREE Silica 'ST Starter Kit'. During 1987, many software houses will be producing games software on ROM cartridges, which will plug directly into the cartridge slot on the 520ST-M keyboard, giving instant loading without the expense of purchasing a disk drive. With the enormous power of the ST, you can expect some excellent titles to be produced, making this the ultimate games machine! If your requirement is for a terminal, then the 520ST-M can fulfill this role too. Leads are available to connect the ST to a variety of monitors, and with the imminent introduction of terminal software on ROM cartridge, the ST provides a low price terminal for business use. If you wish to take advantage of the massive range of disk software available for the ST range, you will need to purchase a disk drive. Atari have two floppy disk drives available, a ½ Mbyte model £149 and a 1Mbyte model £199. Full details of these drives, as well as the Atari 20Mbyte hard disk are available on request. If required at a later date, the mouse may be purchased separately.

£259

520ST-FM

The 520ST-FM with 512K RAM and free mouse, represents a further breakthrough by Atari Corporation in the world of high power, low cost personal computing. This model is the latest addition to the ST family, and is not only powerful, but compact. It is priced at only £399 (inc VAT) a level which brings it within the reach of a whole new generation of computer enthusiasts. When purchased from us, it comes with the FREE Silica 'ST Starter Kit' see paragraph on the left. To make the 520ST-FM ready for use straight away, Atari have built into the keyboard a ½ megabyte disk drive for information storage and retrieval, allowing you easy access to the massive range of disk based software which is available for the ST. This new computer comes with all the correct cables and connections you will need to plug it straight into any standard domestic television set. You do not therefore have to purchase an Atari monitor. If you do require a monitor however, these are available with the 520ST in the following money saving packages:

520ST-FM Keyboard Without Monitor - £399 (inc VAT)
520ST-FM Keyboard + High res mono monitor - £499 (inc VAT)
520ST-FM Keyboard + Low res colour monitor - £599 (inc VAT)
520ST-FM Keyboard + Med res colour monitor - £699 (inc VAT)

Because the 520ST-FM has its own power transformer built into the keyboard, there are no messy external adaptors to clutter up your desk space. You are left with only one mains lead, serving both the disk drive and the computer. You couldn't ask for a more stylish and compact unit.

£399

1040ST-F

For the businessman and the more serious home user, Atari have their most powerful model, the 1040ST-F with 1028K RAM. This low cost powerhouse can be introduced into a business environment as a stand-alone system, or can support a mainframe computer as a terminal. The 1040ST-F not only features twice as much memory as the 520ST-FM, but also includes a more powerful built-in disk drive. The drive featured on the 1040ST-F is a one megabyte double sided model. The extra memory facility of the 1040ST-F makes it ideal for applications such as large databases or spreadsheets. Like the 520ST-FM, the 1040ST-F has a mains transformer built into the console to give a compact and stylish unit with only one mains lead. The 1040ST-F is also supplied from Silica Shop with a free software package and 'ST STARTER KIT'. In the USA, the 1040ST-F has been sold with a TV modulator like the 520ST-FM. However, for the UK market, Atari are manufacturing the 1040ST-F solely with business use in mind and it does not currently include an RF modulator, this means that you cannot use it with a domestic TV (Silica Shop do offer a modulator upgrade for only £49). The 1040ST-F keyboard costs only £599 (inc VAT) and, unless a modulator upgrade is fitted, will require an Atari or third party monitor. There are three Atari monitors available and the prices for the 1040 with these monitors are as follows:

1040ST-F Keyboard Without Monitor - £599 (inc VAT)
1040ST-F Keyboard + High res mono monitor - £699 (inc VAT)
1040ST-F Keyboard + Low res col monitor - £799 (inc VAT)
1040ST-F Keyboard + Med res col monitor - £899 (inc VAT)

The 1040ST-F comes with a mouse controller and includes 1Mbyte of RAM. It has a 1Mbyte double sided disk drive and mains transformer, both built into the keyboard to give a compact and stylish unit, with only one mains lead.

£599

ATARI ST

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REPEL THE DOPPELGANGER WORLD OF ANTI-MATTER

IN THIS NEW BLOCKBUSTER FROM DENTON DESIGNS

T wo worlds – the mirror image of each other, touch in space through a Time-Warp.

O ne is positive, good, familiar – our World; the other is negative, evil yet unnervingly familiar.

T heir interface – a time window through which objects and beings can pass; contact has resulted in the beginning of exchange.

R estore our World – stop the invasion, but do it <u>now</u>, for as the exchange accelerates, the time window grows larger – domination is a hand!

DOUBLE DOMBRE TAKE

STARTLING ACTION · INNOVATIVE GAME PLAY · STATE OF THE ART GRAPHICS

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